Mathematics People

1998 AMS Centennial Fellowships Awarded

The AMS has awarded four Centennial Fellowships for 1998–99. The recipients are MARK ANDREA A. DE CATALDO, STAVROS GAROUFALIDIS, SÁNDOR J. KOVÁCS, and YANGUANG LI.

Mark Andrea A. de Cataldo

Mark Andrea A. de Cataldo received his Ph.D. from the University of Notre Dame in 1995 under the direction of Andrew J. Sommese. He has been a visiting assistant professor at Washington University in St. Louis and a research fellow at the Max-Planck-Institut für Mathematik in Bonn.

Photograph courtesy of Fotoatelier, Bonn, Germany.

de Cataldo's area of research is algebraic geometry. His earlier activity has been in classical projective geometry and low codimension embeddings of projective varieties in homogeneous spaces. His recent work is on notions of singular hermitian metrics and of semipositivity for holomorphic vector bundles with applications to effectivity problems in algebraic geometry by the use of algebraic and analytic techniques.

He plans to use the Centennial Fellowship to visit Harvard University.

Stavros Garoufalidis

Stavros Garoufalidis received his Ph.D. in 1992 from the University of Chicago under the guidance of Melvin Rothenberg. After a year at MSRI he spent two years at MIT as a Moore Instructor. Since then he has held one-year visiting positions at Brown University (1995–96) and Harvard University (1996–97) and is currently at Brandeis University (1997–98).

Photograph courtesy of Stavros Garoufalidis.

Garoufalidis's research has been in the interaction of 3-dimensional topology and mathematical physics. Motivated by the ideas of Chern-Simons exact and perturbative theory, he has given applications of topological quantum field theory invariants to 3-dimensional topology and knot theory. In addition, he has studied relations between new (Jones polynomial) and old (Alexander polynomial) invariants of knots. In the past three years he has been involved in the development of a theory of finite type 3-manifold invariants, with applications in the structure of the mapping class group and in quantum cohomology.

His research plans include a study of Chern-Simons theory, deformation quantization, and quantum cohomology, with a view towards applications to 3-dimensional topology. He will use his Centennial Fellowship to visit Harvard University and the Georgia Institute of Technology.

Sándor J. Kovács

Sándor J. Kovács received his Ph.D. from the University of Utah in 1995 under the supervision of János Kollár. Since then he has been a C. L. E. Moore Instructor at the Massachusetts Institute of Technology.

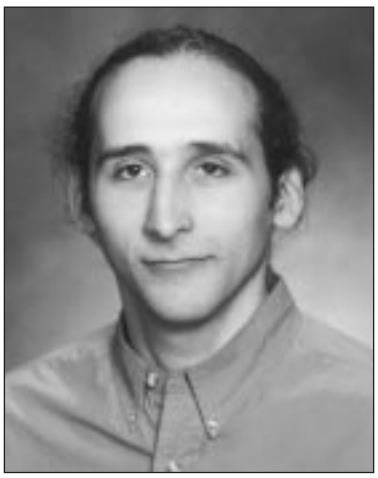

Photo courtesy of Errico Studio, Photography, Somerville, MA.

Kovács's area of research is higher-dimensional algebraic geometry. His works include results toward the Catanese-Schneider-Shokurov conjecture for families of varieties of general type and proofs of Steenbrink's conjecture on rational singularities in general and of Kollár's conjecture on log canonical singularities in dimension 3.

He plans to use his Centennial Fellowship to visit the University of Chicago and the Research Institute for Mathematical Sciences in Kyoto, Japan.

Yanguang Li

Yanguang (Charles) Li received his Ph.D. from Princeton University in 1993 under the supervision of David McLaughlin. For three years Li was a Hedrick assistant professor at the University of California, Los Angeles, and he visited the Mathematical Sciences Research Institute in Berkeley in 1994. Currently he is an instructor at the Massachusetts Institute of Technology. He plans to use the Centennial Fellowship at MSRI.

Photo courtesy of Lydia May Photography, Cambridge, MA.

Li's research has focused on chaos in partial differential equations. In particular, he proved the existence of chaos in perturbed soliton systems. Recently he has become interested in dynamical systems studies on two-dimensional turbulence.

Please note: Information about the competition for the 1999–2000 AMS Centennial Fellowships will be published in the "Mathematics Opportunities" section of an upcoming issue of the *Notices*.

—Allyn Jackson

Guggenheim Fellowships Awarded

The John Simon Guggenheim Memorial Foundation has announced the names of 168 scholars, artists, and scientists who were selected as Guggenheim Fellows in the 1998 competition. The fellows are appointed on the basis of unusually distinguished achievement in the past and exceptional promise for future accomplishment. The awards total $5,376,000.

The following lists those awardees who work in the mathematical sciences, together with their affiliations and research areas.

BRUCE C. BERNDT, University of Illinois at Urbana-Champaign: Ramanujan's lost notebook; JIN-YI CAI, State University of New York at Buffalo: Computational complexity theory; SUN-YUNG ALICE CHANG, University of California, Los Angeles: Studies of the Paneitz operator; DEMETRIOS CHRISTODOULOU, Princeton University: Black holes and spacetime singularities; ROBERT LAZARSFELD, University of Michigan: Linear series on algebraic varieties; GOPAL PRASAD, University of Michigan: Representation theory of reductive p-adic groups; and JOSEPH H. SILVERMAN, Brown University: Number theory and diophantine equations.

—from Guggenheim Foundation News Release

Seiberg and Witten Receive Heineman Prize

EDWARD WITTEN and NATHAN SEIBERG, both of the Institute for Advanced Study (IAS) in Princeton, have received the 1997 Dannie Heineman Prize for Mathematical Physics. The prize of $7,500 is presented to recognize outstanding publications in the field of mathematical physics. They received the prize "for their decisive advances in elucidating the dynamics of strongly coupled supersymmetric field and string theories. The deep physical and mathematical consequences of the electric-magnetic duality they exploited have broadened the scope of mathematical physics."

Edward Witten received his B.A. from Brandeis University in 1971 and his Ph.D. from Princeton University in 1976. After four years as a postdoctoral fellow and Junior Fellow at Harvard University, he joined the faculty at Princeton. He has been a professor of physics at the IAS since 1987. Witten is known for his work in elementary particle theory, especially quantum field theory and string theory and their mathematical implications. He has received the Alan T. Waterman Award from the National Science Foundation and the Award in Physical and Mathematical Sciences from the New York Academy of Sciences. In 1990 Witten received the Fields Medal.

Nathan Seiberg completed his undergraduate education in 1977 at Tel Aviv University and received his Ph.D. from the Weizmann Institute of Science in Israel in 1987. He spent several years as a member at the IAS and was a professor of physics at the Weizmann Institute and at Rutgers Uni-

versity. Currently he is a professor at the IAS. His research interests are in string theory, field theory, and particle physics phenomenology. During the last year Seiberg has been working with various collaborators on exact solutions of supersymmetric field theories and string theories in various dimensions. In 1996 he was awarded a fellowship from the John D. and Catherine T. MacArthur Foundation.

The Heineman Prize was established in 1959 by the Heineman Foundation for Research, Educational, Charitable, and Scientific Purposes, Inc., and is administered jointly by the American Physical Society and the American Institute of Physics. The prize is presented annually.

Nominations for the 1998 Heineman Prize should be sent to: Edward Ott, Department of Physics and Astronomy, University of Maryland, College Park, MD 20742; telephone 301-454-3180; e-mail: e_ott@umail.umd.edu. The deadline for nominations is **July 1, 1998**. Nomination guidelines are available on the Web site of the American Physical Society, http://www.aps.org/.

—from APS Announcement

Garabedian Receives NAS Award

PAUL R. GARABEDIAN has received the National Academy of Sciences (NAS) Award in Applied Mathematics and Numerical Analysis. This $10,000 award, established in 1972 by IBM Corporation, is presented every three years for outstanding work in applied mathematics and numerical analysis by a candidate whose research has been carried out in an institution in North America. Garabedian is on the faculty of the Courant Institute of Mathematical Sciences at New York University. He was chosen "for his spectacular contributions to computational fluid dynamics, especially the mathematical design of the first shock-free transonic airfoil, and for future controlled thermonuclear fusion, the first stellarator with an almost smooth magnetic field."

—from NAS News Release

Le Gall Receives Loève Prize

The 1997 Line and Michel Loève International Prize in Probability has been awarded to JEAN-FRANÇOIS LE GALL, professor at the École Normale Supérieure, Paris. The prize carries a monetary award of about $30,000.

Biographical Sketch

Jean-François Le Gall was born on November 15, 1959, in Morlaix, France. He was a student at the École Normale Supérieure de Paris (1978–82), where he received his Agrégation de Mathématiques (rank 1) (1980). He finished his Ph.D. in 1982, under the direction of Marc Yor, and five years later his Thèse d'État de Mathématiques, both at Université Paris VI. In 1982 Le Gall became Chargé de Recherches of the Centre National de la Recherche Scientifique at Paris VI. He was a professor at Paris VI from 1988 to 1997, when he took his present position as professor at ENS. He received the Rollo Davidson Prize (1986), the Cours Peccot Prize of the Collège de France (1989), and was a junior member of the Institut Universitaire de France (1992–97). In 1992 he was an invited speaker at the first European Congress of Mathematics in Paris. He has been selected as an invited speaker at the International Congress of Mathematicians in Berlin in August 1998.

The Work of Le Gall

Le Gall's early work was mainly concerned with fine properties of Brownian motion, particularly those that relate to cone points and multiple points for the Brownian path, intersection local times, and the Wiener sausage. It is only possible to describe a small selection of Le Gall's results in this area.

A cone point is a point t in time for a planar Brownian motion B such that $B(s) - B(t) \in C_\alpha$ for $0 \le s \le t$, where C_α is a fixed cone with angle α. Le Gall showed that if $\alpha > \pi/2$, then the set of cone points is a regenerative set that is the range of a stable subordinator with index $1 - \pi/2\alpha$. This is an extension of a celebrated result of Spitzer.

A multiple point for the planar Brownian path is a point z in the plane such that the set $\{t \in [0,1] : B(t) = z\}$ has two or more elements. A classical theorem of Dvoretsky, Erdős, and Kakutani states that there exist points z such that the set $\{t \in [0,1] : B(t) = z\}$ has the same cardinality as $[0,1]$. Le Gall established a far–reaching generalization of this result by showing that given any totally disconnected compact subset $K \subset R$, there exists with probability one a point z such that $\{t \in [0,1] : B(t) = z\}$ has the same order type as K.

For each integer $p \ge 2$, the set of multiple points z for which the pre-image $\{t \in [0,1] : B(t) = z\}$ has cardinality p supports a random measure called a renormalized self–intersection local time. Le Gall established a remarkable asymptotic expansion as $\epsilon \downarrow 0$ of the area of the Wiener sausage $\{x : \exists 0 \le t \le 1, |x - B(t)| \le \epsilon\}$ in terms of these objects.

Le Gall's more recent work has focused on measure-valued diffusion processes, particularly the Dawson-Watanabe super Brownian motion. Super Brownian motion arises as the high density limit of a system of branching Brownian motions with critical, finite-variance branching mechanism. Le Gall has introduced a new representation of super Brownian motion with finite variance branching mechanism in terms of the *Brownian snake*, a process that takes values in the space of continuous paths in R^d. The basic idea of the snake is deceptively simple: it is essentially an attempt to carry over to a continuous setting the notion of a depth–first search of a tree. However, the snake turns out to be a powerful tool that enables techniques from Markovian potential theory and excursion theory to be brought to bear on super Brownian motion.

Super Brownian motion is connected with the potential theory of the nonlinear operator $u \mapsto \Delta u - u^2$ in a manner that is somewhat analogous to the connection between or-

dinary Brownian motion and the Laplace operator Δ. Le Gall has shown in a series of papers how the snake can be used to explore this connection and obtain new analytic results using probabilistic tools. Also, Le Gall and Perkins used the snake to give an extremely delicate analysis of the exact Hausdorff measure properties of the support of planar super Brownian motion.

In recent work with Le Jan, Le Gall has found an analogue of the snake that is useful for studying super processes with arbitrary branching mechanisms. Moreover, this work establishes new connections between Lévy processes and continuous state branching processes that are deep extensions of the classical interrelationship between random walks, branching processes, and queues.

About the Prize

The Line and Michel Loève International Prize in Probability was established in 1992 by Mrs. Line Loève and the Department of Statistics at the University of California, Berkeley. It is meant to recognize outstanding contributions of young researchers in probability, where "young" means less than forty-five years of age.

The committee awarding the prize consists of approximately thirty internationally recognized probabilists who are more than forty-five years of age. The committee is selected by a small subcommittee, under the present direction of Lucien LeCam, emeritus, Berkeley. The prize is awarded in alternate years. Past recipients are David Aldous (1993) and Michel Talagrand (1995).

Michel Loève was professor of mathematics and statistics at the University of California, Berkeley, from 1948 until his unexpected death in February 1979. He was the author of a well-received graduate text, *Probability Theory*, published by Springer-Verlag in 1977. Mrs. Line Loève, a psychologist, died very shortly after establishing the prize in July 1992.

—Steven N. Evans and Lucien LeCam, U.C. Berkeley

National Academy of Sciences Elections

The National Academy of Sciences has announced the election of sixty new members and fifteen foreign associates. Among those elected were a number who work in the mathematical sciences. Their names and affiliations are: RONALD R. COIFMAN, Yale University; INGRID DAUBECHIES, Princeton University; DAVID L. DONOHO, Stanford University; and PAUL H. RABINOWITZ, University of Wisconsin, Madison. Elected as foreign associates were KIYOSI ITO, Kyoto University, and ROGER PENROSE, Oxford University.

—National Academy of Sciences Announcement

Sloan Fellows Announced

The Alfred P. Sloan Foundation has announced the names of one hundred outstanding young scientists and economists who have been selected to receive Sloan Research Fellowships. Grants of $35,000 for a two-year period are administered by each Fellow's institution. Once chosen, Fellows are free to pursue whatever lines of inquiry most interest them, and they are permitted to employ fellowship funds in a wide variety of ways to further their research aims.

More than four hundred nominations for the 1998 awards were reviewed by a committee of distinguished scientists. The mathematicians on the committee were David W. McLaughlin, New York University; Peter Sarnak, Princeton University; and Karen Uhlenbeck, University of Texas at Austin.

The Sloan Fellows in mathematics are: YU CHEN, New York University; PANAGIOTA DASKALOPOULOS, University of California, Irvine; MING GU, University of California, Los Angeles; YAN GUO, Brown University; MATTHEW J. GURSKY, Indiana University; LARS HESSELHOLT, Massachusetts Institute of Technology; LIZHEN JI, University of Michigan; LUDMIL KATZARKOV, University of California, Irvine; GREGORY J. KUPERBERG, University of California, Davis; KEFENG LIU, Stanford University; WILLIAM P. MINICOZZI, The Johns Hopkins University; MICHAEL L. MINION, University of North Carolina; WIESLAWA NIZIOL, University of Utah; FELIX OTTO, University of California, Santa Barbara; GEORGE PAPPAS, Princeton University; ARLIE PETTERS, Princeton Univesity; BJORN POONEN, University of California, Berkeley; ZOLTÁN SZABÓ, Princeton University; SUSAN TOLMAN, University of Illinois at Urbana-Champaign; and FERNANDO R. VILLEGAS, University of Texas at Austin.

—Alfred P. Sloan Foundation Announcement

Mathematician Wins Westinghouse Competition

CHRISTOPHER COLIN MIHELICH, seventeen years old and first in his class at Park Tudor School in Indianapolis, Indiana, has won the first place $40,000 scholarship in the Westinghouse Science Talent Search.

The Westinghouse competition is the nation's oldest and most respected high school science scholarship competition. Five Westinghouse winners have gone on to receive Nobel Prizes. Fields Medalists Paul J. Cohen and David B. Mumford were Westinghouse awardees.

Christopher Mihelich, motivated by questions in theoretical physics, studied certain properties of polynomials having applications to geometry and combinatorics. Mihelich hopes to attend Harvard next year to begin work toward a doctorate in mathematics. He would eventually like to teach math at the university level and work as a number theorist.

Placing fifth and receiving a $15,000 scholarship is TRAVIS SCHEDLER, who attends the Illinois Mathematics and

Science Academy in Aurora, Illinois. Schedler's project involved quantum group theory, a subject at the interface of mathematics and physics. Schedler plans to study mathematics and physics at Harvard.

—*Westinghouse Foundation Announcement*

Deaths

EDWARD F. ASSMUS JR., professor emeritus, Lehigh University, Bethlehem, PA, died in March 1998. Born on April 19, 1931, he was a member of the Society for 43 years.

KURT BING, professor emeritus, Rensselaer Polytechnic University, Troy, NY, died on September 24, 1997. Born on April 30, 1914, he was a member of the Society for 47 years.

ALBERTO P. CALDERÓN, professor emeritus, University of Chicago, died on April 16, 1998. Born on September 14, 1920, he was a member of the Society for 49 years.

WILLIAM W. FLEXNER, of London, England, died on April 4, 1998. Born in October 1904, he was a member of the Society for 70 years.

PATRICIA A. FOX, of Cambridge, MA, died on February 28, 1998. Born on June 5, 1952, she was a member of the Society for 19 years.

THOMAS N. E. GREVILLE, of Charlottesville, VA, died on February 18, 1998. Born on December 27, 1910, he was a member of the Society for 65 years.

SHENG WU HE, professor, East China Normal University, Shanghai, People's Republic of China, died on January 23, 1998. Born on July 10, 1940, he was a member of the Society for 5 years.

ROBERT C. HOOPER, associate professor, University of Nevada, Reno, died on March 18, 1998. Born in September 1938, he was a member of the Society for 33 years.

CHARLES W. HUFF, professor emeritus, Winthrop University, Rock Hill, SC, died on March 17, 1998. Born on June 6, 1920, he was a member of the Society for 44 years.

PATRICK J. C. LAMONT, of Macomb, IL, died on March 4, 1998. Born on August 29, 1936, he was a member of the Society for 27 years.

S. A. PARAMHANS, research scientist at the Univ. Grants Commission, Varanasi, India, died on February 9, 1998. Born on July 31, 1941, he was a member of the Society for 17 years.

GRACE S. QUINN, professor emeritus, American University, died on February 4, 1998. Born on December 20, 1906, she was a member of the Society for 69 years.

ABRAHAM SINKOV, professor emeritus, Arizona State University, died on January 19, 1998. Born on August 21, 1907, he was a member of the Society for 35 years.

ELVIRA RAPAPORT STRASSER, professor emeritus, SUNY Stony Brook, died on April 22, 1998. Born on August 29, 1913, she was a member of the Society for 42 years.

A. I. SUBBOTIN, of the Institute of Mathematics and Mechanics, Ekaterinburg, Russia, died on October 14, 1997. He was a member of the Society for 22 years.