Mathematics People

Prizes of the Académie des Sciences de Paris

The Académie des Sciences de Paris has awarded a number of prizes to mathematicians.

Ampère Prize

The Prix Ampère de l'Electricité de France has been awarded to YVES COLIN DE VERDIÈRE of the Université Joseph Fourier, Grenoble I. The prize of 200,000 FF (about $30,000) is one of the major prizes of the Académie des Sciences.

Yves Colin de Verdière

Yves Colin de Verdière has made fundamental contributions to spectral theory. He established a relation between the spectrum of the Laplace operator on a Riemannian manifold and the lengths of closed geodesics. He has proved that if the geodesic flow is ergodic, almost all eigenfunctions are equidistributed ("quantum chaos"). He also obtained important results on the multiplicities of the first eigenvalues and their links with topology. As a corollary he obtained a planarity criterion for graphs. More recently, he has worked on the semiclassical limit for the Schrödinger equation and electrical networks.

State Prize

The State Prize of 50,000 FF is awarded to BERNARD MAUREY of Université Denis Diderot, Paris VII. Bernard Maurey has done fundamental work on the geometry and structure of Banach spaces, beginning with his doctoral thesis devoted to operators between L_p spaces. Around 1980 he proved that the Hardy space H^1 has an unconditional basis, thus solving a major problem. More recently, his joint work with T. Gowers attracted a great deal of attention, in particular with the construction of a Banach space (now called the "Gowers-Maurey space") without any infinite unconditional basis. This construction led to a new concept, that of a hereditarily indecomposable Banach space.

Theme Prizes

The following prizes were awarded for achievement in mathematics: Élie Cartan Prize (25,000 FF): LAURENT CLOZEL, Université Paris-Sud, Orsay, for his work on base change in the theory of automorphic forms.

Jacques Herbrand Prize (15,000 FF): LAURENT MANIVEL, Institut Fourier of the Université Joseph Fourier, Saint-Martin d'Hères, for his work on the cohomology of homogeneous fibers and the geometry of projective varieties.

Joint Gabrielle Sand and M. Guido Triossi Prize (15,000 FF): PIERRE COLMEZ, École Normale Supérieure, Paris, for his work on p-adic analysis.

Langevin Prize (10,000 FF): SYLVESTRE GALLOT, Université Joseph Fourier, Grenoble I, for his pioneering studies on the relationships between topology and integrals of curvature.

Paul Doistau-Emile Blutet Prize (10,000 FF): WANDELIN WERNER, Université Paris-Sud, Orsay, for his contribution to critical indices for Brownian motion.

—From Académie des Sciences announcements

2000 Leibniz Prize Awarded

The Deutsche Forschungsgemeinschaft (DFG) has selected the recipients of its Gottfried Wilhelm Leibniz Prize for the year 2000. Fourteen scientists and scholars have been awarded the prize. Among these are two who work in the mathematical sciences: STEFAN MÜLLER and DIETER LÜST will each receive 1.5 million DM (approximately $750,000) to support research over a period of five years.

Stefan Müller

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Stefan Müller, 37 years old, studied mathematics in Bonn, Edinburgh, and Paris and earned his Ph.D. in Edinburgh. He was an assistant professor at Carnegie-Mellon University before receiving his *habilitation* in Bonn. After professorships in Freiburg and Zürich, Müller assumed his present position as a director of the Max Planck Institute for Mathematics in the Natural Sciences in Leipzig. He is also deputy director of the Mathematical Research Institute at Oberwolfach. Müller is the recipient of the Max Planck Research Prize.

Müller's chief interests lie in applied analysis and partial differential equations. His special achievements have been to apply analysis to a multitude of practical problems in mechanics and material science and to have gained deep and sometimes surprising results. In this manner, with pure mathematics and incursions into physics and mechanics as his starting point, he has created a body of work which could be called "mathematical material science".

Dieter Lüst

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Dieter Lüst, age 43, studied physics at the Technische Universität in Munich and earned his Ph.D. at Ludwig-Maximilians-Universität in Munich. He held a postdoctoral position at the California Institute of Technology during 1985–86. After receiving his *habilitation* in Munich, he was employed at CERN in Geneva as a Heisenberg Fellow. In 1993 he took up an appointment as a full professor at Humboldt-Universität in Berlin. He leads a DFG-sponsored postgraduate research group in particle physics and since 1998 has been an external member of the Max Planck Institute for Gravitational Physics in Potsdam-Golm.

Lüst's fields are string and supersymmetrical field theories. His research is directed at basic questions that combine quantum and gravitational physics in order to gain a uniform understanding of all physical forces and to achieve a uniform description of the numerous elementary particles constituting matter.

About the Leibniz Prize

The aim of the Leibniz Prize program, which was instituted by the DFG in 1985, is to improve the working conditions of outstanding scientists and scholars, to broaden their opportunities for research, to relieve them of administrative burdens, and to facilitate their employment of especially highly qualified young academics. The prizewinners are permitted the greatest possible freedom in the way they use the prize funds. Universities, the Max Planck Society, and former prizewinners made over 100 nominations for the 2000 prize. The DFG is the main scientific research funding agency of the German government.

—From a DFG announcement

Sznitman Receives 1999 Loève Prize

The 1999 Line and Michel Loève International Prize in Probability has been awarded to ALAIN-SOL SZNITMAN of the Eidgenössisches Technisches Hochschule, Zürich. The prize, which carries a monetary award of about $30,000, was presented at the University of California, Berkeley, in January 2000.

Biographical Sketch

Alain-Sol Sznitman was born in 1955 in France. He was a student at the École Normale Supérieure in Paris from 1975 to 1979. In 1987 he became associate professor at the Courant Institute for Mathematical Sciences, New York University, and he assumed his present position as professor at the ETH in Zürich in 1991. He was director of the Mathematics Research Institute of the ETH from 1995 to 1999. He received the Rollo Davidson Prize in 1991, delivered a plenary lecture at the European Congress of Mathematics in 1992 in Paris, and was an invited speaker at the International Congress of Mathematicians 1998 in Berlin.

The Work of Sznitman

The central topics of Sznitman's mathematical research are interacting stochastic systems, mainly in connection with nonlinear partial differential equations, and random media. One of his main research interests in the late 1980s was interacting systems of Boltzmann type and corresponding propagation of chaos results. A central problem in interacting particle systems is to derive equations that govern the macroscopic development of the system from a microscopic description. The macroscopic equations are usually linked to this microscopic description via propagation of chaotic behavior, meaning that on large microscopic pieces of the space the process propagates some purely random part, for instance by exhibiting and maintaining some purely Poisson structure. Sznitman has greatly advanced our understanding of such phenomena in a number of important cases. One is a model of mutually (locally) annihilating Brownian particles in a Boltzmann type regime. He found a surprising link between the nonlinear equation for the macroscopic development and a probabilistic tree construction, where the interplay comes from a local propagation of chaos result. Quite surprisingly, such probabilistic tree constructions also show up in much later work of

Sznitman (with Yves Le Jan) in a different context, namely, in their treatment of the Navier-Stokes equation.

Since around 1990 Sznitman has mainly worked on random media. He has developed a completely new method for problems of random walks and Brownian motion among random traps and related issues. A typical question is the following: Given random media consisting of a Poisson potential, which is influencing the Brownian, for instance, by local killing, what are the long-time survival probabilities and what are the (probabilistic) properties of the surviving paths? The survival rates can be expressed in properties of low-lying eigenvalues for the corresponding Dirichlet problem in random media. Sznitman has developed an extremely powerful method for treating such eigenvalue problems in disordered media. A basic difficulty is the high complexity generated by the environment. The problem should "simplify" in the limit, in the sense that simply structured "pockets of low-lying eigenvalues" become dominant. These dominant pockets are responsible for what is sometimes called "intermittency" of the system. In order to treat these questions, Sznitman has developed his method of enlargement of obstacles. The idea is to replace the obstacles by bigger ones, reducing the combinatorial complexity of the system. However, one must make a careful analysis differentiating between different types of obstacles according to their surroundings. In this way, Sznitman has been able to analyze very precisely a number of problems connected with random traps, like giving precise information about pinning of random walks. The method is not restricted to random trap problems, as has become increasingly clear in recent years. It has been applied and extended, for instance, to random saturation problems and to random Schrödinger operators in the presence of a magnetic field (in works by G. Ben Arous, L. Erdős, and others). It is also clear that these problems are closely related to complex problems on disordered Gibbs measures in the regime of the so-called Griffiths singularity.

In his most recent investigations Sznitman applies similar ideas to a non-self-adjoint setting, namely, to multidimensional random walks in random environments, where his research has led to considerable progress in understanding. Based on ideas closely related to the ones described above, this work again stresses the dominant role of pockets of exceptional behavior but is carried out in a more delicate non-self-adjoint setting, which can no longer be described by eigenvalues.

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 by researchers in probability who are less than 45 years of age. The committee awarding the prize consists of approximately thirty internationally recognized probabilists who are more than 45 years of age. The prize is awarded in alternate years. Past recipients are David Aldous (1993), Michel Talagrand (1995), and Jean-François Le Gall (1997).

Michel Loève was professor of mathematics and statistics at the University of California, Berkeley, from 1948 until his unexpected death in 1979. His wife, a psychologist, died very shortly after establishing the prize in 1992.

—Lucien LeCam, University of California, Berkeley, and Erwin Bolthausen, University of Zürich

Lebowitz Receives Poincaré Prize

JOEL L. LEBOWITZ, who has made outstanding contributions to both statistical physics and the fight for human rights for oppressed scientists around the world, has received the Henri Poincaré Prize for mathematical physics from the International Association of Mathematical Physics (IAMP). Lebowitz is the George William Hill Professor of Mathematics and Physics at Rutgers University.

The Poincaré Prize recognizes outstanding contributions that set the foundation for novel developments in mathematical physics. The prize will be awarded at the thirteenth IAMP conference in London in the summer of 2000 and includes a cash award of 5,000 euros (about $4,900).

Other honors conferred on Lebowitz include the Boltzmann Medal of the International Union of Pure and Applied Physics, the A. Cressy Morrison Award in Natural Sciences from the New York Academy of Sciences, and the Rutgers Board of Trustees Award for Excellence in Research.

—From a Rutgers University news release

Guionnet Awarded Oberwolfach Prize

ALICE GUIONNET of Université de Paris-Sud has received the 1999 Oberwolfach Prize for outstanding research in the mathematical field of stochastics. She received the prize at a ceremony on November 5, 1999, at the Mathematical Research Institute in Oberwolfach, Germany, and presented a lecture entitled "Large random matrices".

The Oberwolfach Prize is awarded by the Gesellschaft für Mathematische Forschung e.V. to European mathematicians not older than 35 years. The prize recognizes excellent achievements in a specific field of mathematics, which changes each time the prize is given. The prize carries a monetary award of 10,000 DM (approximately $5,000) and was financed by the friends of Oberwolfach (Förderverein für mathematische Forschung e.V.).

Previous recipients of the Oberwolfach Prize are Peter Kronheimer (topology and geometry, 1991), Jörg Brüdern and Jens Franke (number theory and algebra, 1993), and Gero Friesecke and Stefan Sauter (analysis and applied mathematics, 1996).

—Allyn Jackson

AIM Five-Year Fellows Announced

The American Institute of Mathematics (AIM) has announced that the recipients of five-year fellowships for the year 2000 are HENRY COHN of Harvard University and VADIM KALOSHIN of Princeton University. They were chosen from a pool of more than 120 applicants.

Henry Cohn received his B.S. in mathematics from the Massachusetts Institute of Technology in 1995. He will receive his Ph.D. in 2000 with a thesis on "New bounds on sphere packings". In his thesis he develops new techniques that improve upper estimates on the packing density of spheres in Euclidean spaces of dimensions 4 through 36. He has published several papers in combinatorics and number theory. His interests also include the question of the irrationality of the Riemann zeta function for arguments that are odd integers and that are greater than or equal to 5.

Vadim Kaloshin received his B.S. from Moscow State University in 1994. He will receive his Ph.D. in 2000 in the area of dynamical systems with a thesis on "Growth of number of periodic orbits of generic diffeomorphisms". His thesis contains a new, more elementary, proof of the Artin-Mazur result that "every smooth invertible self-map of a compact manifold can be approximated by one for which the number of periodic points of period p is less than an exponential function of p" and also shows that the number of periodic points of period p can grow arbitrarily fast with p for a generic set of smooth invertible self-maps of a compact manifold. With B. Hunt, Kaloshin has shown that the Hausdorff dimension of a fractal set in a Banach space is not necessarily preserved under projection to finite-dimensional Euclidean space.

The AIM five-year fellowships are awarded each year to outstanding new Ph.D. recipients to support research in an area of pure mathematics. The fellowships cover sixty months of full-time research, as well as funds for travel and equipment. Each fellowship carries a stipend of $4,000 per month, with an additional $4,000 per year allocated for travel and equipment.

—From an AIM announcement

National Academy of Engineering Elections

The National Academy of Engineering has announced the election of seventy-eight new members and eight foreign associates, including six for work in the mathematical sciences. TAMER BASAR of the University of Illinois, Urbana-Champaign, was elected for work on the development of dynamic game theory and application to robust control of systems with uncertainty. JAMES R. BASSINGTHWAITE of the University of Washington, Seattle, was elected for contributions to integrative physiology and bioengineering using transport theory and computational methods. HOWARD R. BAUM of the National Institute of Standards and Technology was elected for developing and implementing broadly applicable analytical models and numerical tools for understanding and mitigating fire phenomena. JAMES W. COOLEY of the University of Rhode Island was elected for the creation and development of the Fast Fourier Transform (FFT) algorithm for time series analysis. HENRY H. RACHFORD JR., of Stoner Associates, Inc., Houston, Texas, was elected for contributions in the numerical solution of partial differential equations to solve petroleum reservoir and pipeline hydraulics problems. JACOB T. SCHWARTZ of the Courant Institute of Mathematical Sciences of New York University was elected for contributions to the theory and practice of programming language design, compiler technology, and parallel computation.

—From a National Academy of Engineering announcement

Deaths

CHARLES L. BOTTOMS, a teacher at Booker T. Washington High School, Tulsa, OK, died on December 5, 1999. Born on January 14, 1945, he was a member of the Society for 10 years.

ARTHUR B. BROWN, of Floral Park, NY, died on November 8, 1999. Born on February 10, 1905, he was a member of the Society for 71 years.

JOHN A. NOHEL, professor emeritus at the University of Wisconsin, Madison, died on November 1, 1999. Born on October 24, 1924, he was a member of the Society for 49 years.

GEORGE W. PETRIE III, of Port Angeles, WA, died on October 18, 1999. Born on May 6, 1912, he was a member of the Society for 62 years.

RAYMOND W. SOUTHWORTH, of Williamsburg, VA, died on January 22, 2000. Born on October 23, 1920, he was a member of the Society for 31 years.