

Lovász and Stein Share 1999 Wolf Prize in Mathematics



Photograph courtesy of the Wolf Foundation.

László Lovász

The 1999 Wolf Prize in Mathematics will be shared by LÁSZLÓ LOVÁSZ “for his outstanding contributions to combinatorics, theoretical computer science, and combinatorial optimization,” and ELIAS M. STEIN “for his contributions to classical and Euclidean Fourier analysis and for his exceptional impact on a new generation of analysts through his eloquent teaching and writing.”

The Wolf Prize was established in 1978 by the late German-born Ricardo Wolf. A resident of Cuba for many years, Wolf served as Fidel Castro’s ambassador to Israel. Later Wolf moved to Israel and lived there until his death in 1981. The Israel-based Wolf Foundation administers the prizes, which are awarded to outstanding scientists and artists for achievement in the interest of mankind and friendly relations among peoples. The annual prizes of \$100,000 in each area are given in four out of five scientific fields in rotation: agriculture,



Photograph by Denise Applewhite, 1999, courtesy of Princeton University Communications Department.

Elias M. Stein

chemistry, mathematics, medicine, and physics. In the arts, the prize rotates among architecture, music, painting, and sculpture. The 1999 Wolf Prizes will be conferred by Ezer Weizmann, president of Israel, at a special ceremony in the Knesset, or parliament, on May 5, 1999.

László Lovász

László Lovász has obtained ground-breaking results in discrete mathematics that have had significant applications to other areas of pure and applied mathematics as well as to theoretical computer science. He solved several outstanding problems, including the perfect graph conjecture, Kneser’s conjecture, and the determination of the Shannon capacity of the pentagon, by introducing deep mathematical methods relying on geometric polyhedral and topological techniques. His algorithmic ideas—including applications of the ellipsoid method in combinatorial optimization, the lattice basis reduction algorithm, the matroid parity algorithm, and the improved procedures for volume computation—all had profound influence on theoretical computer science. Lovász also contributed to the PCP characterization of NP and its connection to the hardness of approximation. His “Local Lemma” is one of the main early results in the development of the probabilistic method. His comprehensive books and fascinating lectures have stimulated mathematical research around the world.

László Lovász was born in 1948 in Budapest, Hungary. He received his Dr. Rer. Nat. degree from Eötvös Loránd University in 1971 and his Dr. Math. Sci. degree from the Hungarian Academy of

Sciences in 1977. He was a professor at Jozsef Attila University (1978–82) and at Eötvös Loránd University (1983–93) before assuming his present position as professor in the Department of Computer Science at Yale University. He received the George Pólya Prize of the Society for Industrial and Applied Mathematics (1979), the D. Ray Fulkerson Prize of the AMS (1982), the State Prize of Hungary (1985), the Brouwer Medal of the Dutch Mathematical Society (1993), and the National Order of Merit of Hungary (1998). Since 1979 he has been a corresponding member of the Hungarian Academy of Sciences.

Elias M. Stein

Elias M. Stein has made fundamental contributions in mathematical analysis understood in a very broad sense. He developed (jointly with G. Weiss and C. Fefferman) the theory of Hardy spaces in several real variables; in particular, this emphasized the role of duality between the Hardy spaces and the BMO spaces introduced earlier by F. John and L. Nirenberg. In the representation theory of Lie groups, Stein discovered, with R. Kunze, the so-called Kunze-Stein phenomenon, classical by now, regarding harmonic analysis and certain nonunitary representations of semisimple Lie groups. Stein also made a profound contribution to the $\bar{\partial}$ -problem of several complex variables. He is one of the creators of multidimensional Euclidean Fourier analysis, having shaped classical analysis by recognizing the role of singular integrals, Radon transforms, and maximal operators obtained by integration on lower-dimensional manifolds in Euclidean spaces. The clarity of his expository monographs and the contributions of his numerous outstanding students have had a deep impact on the development of the field.

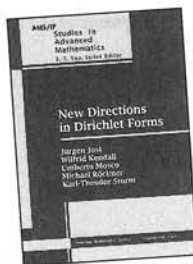
Elias M. Stein was born in 1931 in Belgium. He received his B.A. in 1951, his M.A. in 1953, and his Ph.D. in 1955, all from the University of Chicago. He held positions at the Massachusetts Institute of Technology and the University of Chicago before going to Princeton University in 1963, where he is currently a professor of mathematics. He was a member at the Institute for Advanced Study during 1962–63 and 1984–85. In 1974 Stein was elected to the National Academy of Sciences, and in 1982 he was elected to the American Academy of Arts and Sciences. He received honorary doctorates from Peking University (1988) and the University of Chicago (1992). In 1984 he received from the AMS the Steele Prize for Exposition, and in 1993 he received the Schock Prize of the Swedish Academy of Sciences.

—from Wolf Foundation announcement

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New in Algebra and Algebraic Geometry

New Directions in Dirichlet Forms



Jürgen Jost, *Max Planck Institute for Mathematics, Leipzig, Germany*, Wilfrid Kendall, *University of Warwick, Coventry, England*, Umberto Mosco, *University of Rome "La Sapienza", Italy*, Michael Röckner, *University of Bielefeld, Germany*, and Karl-Theodor Sturm, *University of Bonn, Germany*

The theory of Dirichlet forms brings together methods and insights from the calculus of variations, stochastic analysis, partial differential and difference equations, potential theory, Riemannian geometry and more. This book features contributions by leading experts and provides up-to-date, authoritative accounts on exciting developments in the field and on new research perspectives. Topics covered include the following: stochastic analysis on configuration spaces, specifically a mathematically rigorous approach to the stochastic dynamics of Gibbs measures and infinite interacting particle systems; subelliptic PDE, homogenization, and fractals; geometric aspects of Dirichlet forms on metric spaces and function theory on such spaces; generalized harmonic maps as nonlinear analogues of Dirichlet forms, with an emphasis on non-locally compact situations; and a stochastic approach based on Brownian motion to harmonic maps and their regularity.

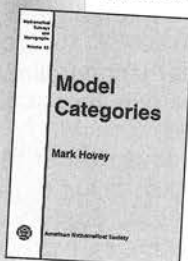
Various new connections between the topics are featured, and it is demonstrated that the theory of Dirichlet forms provides the proper framework for exploring these connections.

Titles in this series are co-published with International Press, Cambridge, MA.

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Model Categories

Mark Hovey, *Wesleyan University, Middletown, CT*



Model categories are a tool for inverting certain maps in a category in a controllable manner. As such, they are useful in diverse areas of mathematics. The list of such areas is continually growing.

This book is a comprehensive study of the relationship between a model category and its homotopy category. The author develops the theory of model categories, giving a careful development of the main examples. One highlight of the theory is a proof that the homotopy category of any model category is naturally a closed module over the homotopy category of simplicial sets.

Little is required of the reader beyond some category theory and set theory, making the book accessible to graduate students. The book begins with the basic theory of model categories and proceeds to a careful exposition of the main examples, using the theory of cofibrantly generated model categories. It then develops the general theory more fully, showing in particular that the homotopy category of any model category is a module over the homotopy category of simplicial sets, in an appropriate sense. This leads to a simplification and generalization of the loop and suspension functors in the homotopy category of a pointed model category. The book concludes with a discussion of the stable case, where the homotopy category is triangulated in a strong sense and has a set of small weak generators.

Mathematical Surveys and Monographs, Volume 63; 1999; 207 pages; Hardcover; ISBN 0-8218-1359-5; List \$54; Individual member \$32; Order code SURV/63NA



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