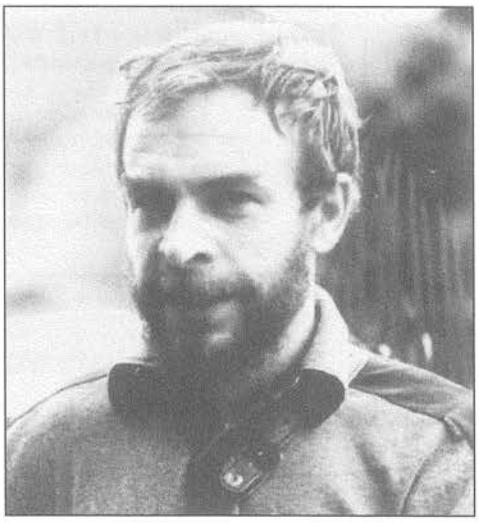
Mikhael Gromov Receives Balzan Prize



Mikhael Gromov

MIKHAEL GROMOV has received the 1999 Balzan Prize for Mathematics. He was honored "for his numerous, most original and profound contributions to geometry in all its forms, and for the ways in which he has applied them to many other fields related to mathematics and theoretical physics." The prize is given by the Fondazione Internazionale Premio E. Balzan and carries a cash award of 500,000 Swiss francs (about US$333,000). Gromov received the prize at a ceremony on November 16, 1999, in Bern, Switzerland. Also receiving Balzan Prizes were John H. Elliott (history), Paul Ricoeur (philosophy), and Luigi Luca Cavalli-Sforza (the science of human origins).

The Work of Mikhael Gromov

Gromov's work covers all areas of geometry and its relations with neighboring fields such as topology and analysis. He brings a profoundly original and expansive viewpoint to any subject he works on. This viewpoint illuminates the subject and opens spectacular vistas that cannot be seen with one's nose closer to the ground and sometimes creates a whole new subject that is then explored by many other researchers for years, long after Gromov has moved on.

A hallmark of much of Gromov's work is the softening of geometry, whereby equations are replaced by inequalities or approximate or asymptotic equations. Examples include the "coarse" viewpoint on Riemannian geometry, which considers all Riemannian structures at once, the "homotopic" viewpoint on partial differential equations, which solves overdetermined systems via topology, and the "asymptotic" viewpoint on geometric group theory. Gromov has revolutionized symplectic geometry by the introduction of methods from complex analysis and has given important impulses to index theory and to sub-Riemannian (or Carnot-Carathéodory) geometry. He has introduced many important new concepts into geometry, most of which are outgrowths of his "coarse" or "soft" viewpoint: almost flatness of metrics and connections, simplicial volume, K-area, hyperbolicity of groups, etc.

A few of the many concrete results proved by Gromov are: the existence of foliations on open manifolds, the volume comparison estimate generalizing a result of Bishop, the finiteness of positively curved manifolds, the nonexistence of metrics of positive scalar curvature on flat or hyperbolic and other enlargeable manifolds (joint with H. B. Lawson Jr.), the construction of manifolds of variable negative curvature (with W. P. Thurston), the construction of nonarithmetic lattices in hyperbolic spaces (with I. Piatetski-Shapiro), and the uniqueness of the symplectic structure on the complex projective plane (completed by C. H. Taubes).

Gromov has had, and will continue to have, a widespread influence on contemporary mathematics.

Biographical Sketch

Mikhael L. Gromov was born on December 23, 1943, in Boksitogorsk, USSR, and has been a French citizen since 1992. He studied at the University of Leningrad, where he received his doctorate in 1969. In 1974 he left the USSR and became a professor at the State University of New York at Stony Brook. In 1981 he moved to the Université de Paris and the following year assumed his present position as a permanent professor at the Institut des Hautes Études Scientifiques in Bures-sur-Yvette, France.

Gromov has received many prizes and honors, including the Prize of the Mathematical Society of Moscow (1971), the Oswald Veblen Prize of the AMS (1981), the Prix Élie Cartan de l'Académie des Sciences de Paris (1984), the Prix de l'Union des Assurances de Paris (1989), the Wolf Prize (1993), the AMS Leroy P. Steele Prize for Seminal Contribution to Research (1997), and the Lobachevski Medal (1997). He was an invited speaker at the International Congress of Mathematicians in Nice (1970), Helsinki (1978), Warsaw (1982), and Berkeley (1986). He is a foreign member of the U.S. National Academy of Sciences and of the American Academy of Arts and Sciences and a *membre de l'institut* of l'Académie des Sciences de Paris.

About the Balzan Prize

The Balzan Prize is among the most important humanistic and scientific awards in the world. The winners are selected by a General Prize Committee made up of eighteen prominent European scientists and academics. The committee evaluates candidate proposals from universities and academies all over the world. The prizes are interdisciplinary in nature, and the prize categories range over literature, moral science and art, medicine, and physical, mathematical, and natural sciences. The Italian-Swiss Balzan Foundation, which has headquarters in Milan and Zürich, was started in 1956 with funds from the daughter of Eugenio Balzan, who inherited a large estate from her father and decided to use it to honor his memory. Eugenio Balzan was born in 1874 and was a proofreader, reporter, and manager for *Corriere della Sera*, the most important Italian daily newspaper. He also became a shareholder in the paper, lived parsimoniously, and invested his earnings shrewdly. In 1933 he settled in Switzerland, mostly because of his opposition to Fascism. He died in 1953 in Lugano.

Among previous recipients of the Balzan Prize are the following mathematical scientists: Andrej Kolmogorov (1962), Enrico Bombieri (1980), Jean-Pierre Serre (1985), Otto Neugebauer (1986), Armand Borel (1992), and Robert May (1998).

—Allyn Jackson