

# Atiyah and Singer Receive 2004 Abel Prize

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2004 jointly to SIR MICHAEL FRANCIS ATIYAH of the University of Edinburgh and ISADORE M. SINGER of the Massachusetts Institute of Technology. They are receiving the prize "for their discovery and proof of the index theorem, bringing together topology, geometry and analysis, and their outstanding role in building new bridges between mathematics and theoretical physics."

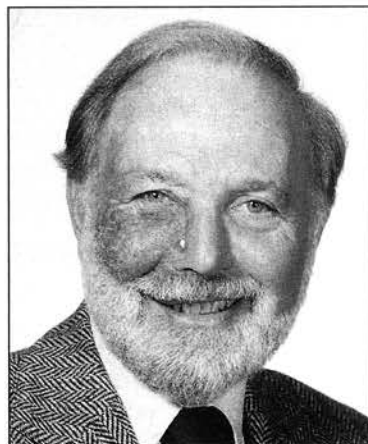
The Atiyah-Singer index theorem is one of the great landmarks of twentieth-century mathematics, influencing profoundly many of the most important later developments in topology, differential geometry, and quantum field theory. Its authors, both jointly and individually, have been instrumental in repairing a rift between the worlds of pure mathematics and theoretical particle physics, initiating a cross-fertilization that has been one of the most exciting developments of the last few decades.

Michael Francis Atiyah and Isadore M. Singer are among the most influential mathematicians of the last century and are still working. With the index theorem they changed the landscape of mathematics. Over a period of twenty years they worked together on the index theorem and its ramifications.

Atiyah and Singer came originally from different fields of mathematics—Atiyah from algebraic geometry and topology, Singer from analysis. Their main contributions in their respective areas are also highly recognized. Atiyah's early work on meromorphic forms on algebraic varieties and his important 1961 paper on Thom complexes are such examples. His pioneering work with Friedrich Hirzebruch on the development of the topological analogue of Grothendieck's K-theory had numerous applications to classical problems of topology and turned out later to be deeply connected with the index theorem.



Sir Michael Francis Atiyah



Isadore M. Singer

Singer initiated the subject of triangular operator algebras (jointly with Richard V. Kadison). His name is also associated with the Ambrose-Singer holonomy theorem and the Ray-Singer torsion invariant. Singer, together with Henry P. McKean, pointed out the deep geometrical information hidden in heat kernels, a discovery that had great impact.

## Biographical Sketch: Michael Atiyah

Michael Francis Atiyah was born in 1929 in London. He got his B.A. and his doctorate from Trinity College, Cambridge. The greatest part of his academic career was spent in Cambridge and Oxford. He has held many prominent positions, among them the highly prestigious Savilian Chair of Geometry at Oxford and that of Master of Trinity College, Cambridge. Atiyah has also been professor of mathematics at the Institute for Advanced Study in Princeton.

Atiyah rejuvenated British mathematics during his years at Oxford and Cambridge. He was also the driving force behind the creation of the Isaac Newton Institute for Mathematical Sciences in Cambridge and became its first director. Atiyah is now retired and an honorary professor at the University of Edinburgh.

Atiyah has received many honors during his career, including the Fields Medal (1966). He was elected a Fellow of the Royal Society, London, in 1962 at the age of thirty-two. He was awarded the Royal Medal of the Society in 1968 and its Copley Medal in 1988. Atiyah was president of the Royal Society from 1990 to 1995. He has served as president of the London Mathematical Society (1974–76). He has also played an important role in the shaping of today's European Mathematical Society.

Atiyah was responsible for the founding of the Inter-Academy Panel that brought together many of the world's academies of science. Atiyah also instigated the formation of the Association of European Academies (ALLEA). He has been president of Pugwash Conferences on Science and World Affairs.

Among the prizes he has received are the Feltrinelli Prize from the Accademia Nazionale dei Lincei (1981) and the King Faisal International Prize for Science (1987). Atiyah was knighted in 1983 and made a member of the Order of Merit in 1992.

### Biographical Sketch: I. M. Singer

Isadore M. Singer was born in 1924 in Detroit and received his undergraduate degree from the University of Michigan in 1944. After obtaining his Ph.D. from the University of Chicago in 1950, he joined the faculty at the Massachusetts Institute of Technology. Singer has spent most of his professional life at MIT, where he is currently an Institute Professor.

Singer is a member of the American Academy of Arts and Sciences, the American Philosophical Society, and the National Academy of Sciences (NAS). He served on the Council of the NAS, the Governing Board of the National Research Council, and the White House Science Council. Singer was vice president of the AMS, 1970–72.

In 1992 Singer received the AMS Award for Distinguished Public Service. The citation recognized his "outstanding contribution to his profession, to science more broadly and to the public good."

Among the other awards he has received are the Bôcher Prize (1969) and the Steele Prize for Lifetime Achievement (2000), both from the AMS, the Eugene Wigner Medal (1988), and the National Medal of Science (1983).

In his response upon receiving the Steele Prize (*Notices*, April 2000), Singer stated: "For me the classroom is an important counterpart to research. I enjoy teaching undergraduates at all levels, and I have a host of graduate students, many of whom have ended up teaching me more than I have taught them." Singer has also written influential textbooks that have inspired generations of mathematicians.

—From a news release of the Norwegian Academy of Science and Letters

### About the Abel Prize

The Abel Prize is presented by the Norwegian Academy of Science and Letters in recognition of outstanding scientific work in the field of mathematics. The prize amount is 6 million Norwegian kroner (about US\$625,000). On the committee choosing the recipients of the 2004 Abel Prize were David Mumford, Jacob Palis, Erling Størmer (chair), Gilbert Strang, and Don Zagier. The Abel Prize was awarded for the first time in 2003 to Jean-Pierre Serre.

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