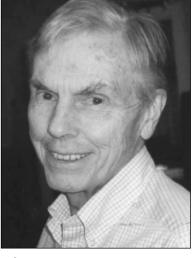# Sato and Tate Receive 2002-2003 Wolf Prize

The 2002–2003 Wolf Prize in Mathematics has been awarded to MIKIO SATO, of the Research Institute for Mathematical Sciences, Kyoto University, Kyoto, Japan; and to JOHN T. TATE, Department of Mathematics, University of Texas, Austin. Sato was honored "for his creation of 'algebraic analysis', including hyperfunction and microfunction theory, holonomic quantum field theory, and a unified theory of soliton equations." Tate was honored "for his creation of fundamental concepts in algebraic number theory." The two share the $100,000 prize.

Mikio Sato

John T. Tate

Mikio Sato

Mikio Sato's vision of "algebraic analysis" and mathematical physics initiated several fundamental branches of mathematics. He created the theory of hyperfunctions and invented microlocal analysis, which allowed for a description of the structure of singularities of (hyper)functions on cotangent bundles. Hyperfunctions, together with integral Fourier operators, have become a major tool in linear partial differential equations. Along with his students, Sato developed holonomic quantum field theory, providing a far-reaching extension of the mathematical formalism underlying the two-dimensional Ising model, and introduced along the way the famous tau functions. Sato provided a unified geometric description of soliton equations in the context of tau functions and infinite-dimensional Grassmann manifolds. This was extended by his followers to other classes of equations, including self-dual Yang-Mills and Einstein equations. Sato has generously shared his ideas with young mathematicians and has created a flourishing school of algebraic analysis in Japan.

Mikio Sato was born in 1928 in Tokyo. He received his B.Sc. (1952) and his Ph.D. (1963) from the University of Tokyo. He was a professor at Osaka University and at the University of Tokyo before moving to the Research Institute for Mathematical Sciences at Kyoto University in 1970. He served as director of that institute from 1987 to 1991. He is now a professor emeritus at Kyoto University. He received the Asahi Prize of Science (1969), the Japan Academy Prize (1976), the Person of Cultural Merits award of the Japanese Education Ministry (1984), the Fujiwara Prize (1987), and the Schock Prize of the Royal Swedish Academy of Sciences (1997). In 1993 he was elected to foreign membership in the U.S. National Academy of Sciences.

John T. Tate

For over a quarter of a century, John Tate's ideas have dominated the development of arithmetic algebraic geometry. Tate has introduced path-breaking techniques and concepts that initiated many theories that are very much alive today. These include Fourier analysis on local fields and adele rings, Galois cohomology, the theory of rigid analytic varieties, and p-divisible groups and p-adic Hodge decompositions, to name but a few. Tate has been an inspiration to all those working in number theory. Numerous notions bear his name: Tate cohomology of a finite group, Tate module of an abelian variety, Tate-Shafarevich group, Lubin-Tate groups, Neron-Tate heights, Tate motives, the Sato-Tate conjecture, Tate twist, Tate elliptic curve, and others. John Tate is a revered name in algebraic number theory.

John Tate was born in 1925 in Minneapolis. He received his A.B. from Harvard College (1946) and his Ph.D. from Princeton University (1950). He was a research assistant and instructor at Princeton (1950–53) and a visiting professor at Columbia University (1953–54) before moving to Harvard University. He was a professor at Harvard until 1990, when he accepted his present position as professor and Sid W. Richardson Chair in Mathematics at the University of Texas at Austin. Tate received the AMS Cole Prize (1956), a Sloan Fellowship (1959–61), and a Guggenheim Fellowship (1965–66). He was elected to the U.S. National Academy of Sciences (1969) and was named a foreign member of the French Academy of Sciences (1992) and an honorary member of the London Mathematical Society (1999).

About the Wolf Prize

The Israel-based Wolf Foundation was established by the late German-born inventor, diplomat, and philanthropist Ricardo Wolf. A resident of Cuba for many years, Wolf became Fidel Castro's ambassador to Israel, where Wolf lived until his death in 1981. The Wolf Prizes have been awarded since 1978 to outstanding scientists and artists "for achievements in the interest of mankind and friendly relations among peoples, irrespective of nationality, race, color, religion, sex, or political view." The prizes of $100,000 are given each year in four out of five scientific fields, in rotation: agriculture, chemistry, mathematics, medicine, and physics. In the arts the prize rotates among architecture, music, painting, and sculpture. The 2002–2003 prizes will be conferred by the president of Israel at a ceremony at the Knesset (the Israeli parliament) in Jerusalem on May 11, 2003.

—Allyn Jackson