

# Manin and Shor Receive 2002 Faisal Prize



**Yuri I. Manin**



**Peter W. Shor**

On November 27, 2001, in Riyadh, Saudi Arabia, Prince Khaled Al-Faisal, director general of the King Faisal Foundation, announced the winners of the 2002 King Faisal International Prize. Mathematics was the topic for the 2002 Faisal Prize in Science, which was presented to YURI I. MANIN and to PETER W. SHOR.

Manin is widely regarded as one of the outstanding mathematicians of the twentieth century. His work spans such diverse branches of mathematics as algebraic geometry, number theory, and mathematical physics. His many fundamental contributions include the solution of major problems and the development of new techniques that enabled further research. In particular, he is known for his 1963 proof of the Mordell conjecture for function fields. He drew intuition from geometry to make strides in number theory, particularly in Diophantine geometry (Brauer-Manin obstruction),  $p$ -adic analysis, and the theory of modular forms. He has also made many contributions to mathematical physics, including work on Yang-Mills instantons, quantum groups, and quantum cohomology. Manin is a director of the Max-Planck-Institut für Mathematik in Bonn, Germany and a leading researcher at the Steklov Mathematical Institute in Moscow (since 1993 in absentia). He has received many awards, including the Lenin Prize for Science (1967), the Brouwer Gold Medal (1987), the Nemmers Prize in Mathematics (1994), the Rolf

Schock Prize in Mathematics (1999), and the Georg Cantor Medal (2002).

In 1994, Peter Shor received worldwide recognition for demonstrating that the uncertainty inherent in quantum systems could be used to factor integers much more quickly than any known algorithm based on the logic of conventional computers. This was the first clear demonstration that quantum systems could increase computing power far beyond today's computers. Shor's breakthrough sparked an explosion of research into the development of quantum computers, which at present remain in the realm of theory. In addition, his result generated great concern about the security of cryptographic systems based on the difficulty of factoring large numbers. Shor has also done work on quantum error-correcting codes and fault-tolerant quantum computation that addresses some of the main obstacles to making quantum computers a reality. Shor is a member of the research staff at AT&T Laboratories. His honors and awards include the Nevanlinna Prize (1998) and a MacArthur Fellowship (1999). He also received the Gödel Prize for his paper "Polynomial-Time Algorithms for Prime Factorization and Discrete Logarithms on a Quantum Computer" (*SIAM Journal of Computing* 26 (1997), no. 5, pages 1484-1509).

The King Faisal Foundation (<http://www.kfff.com/>) each year awards International Prizes for Service to Islam, for Islamic Studies, for Arabic Literature, for Medicine, and for Science. The prize for science rotates among the fields of biology, physics, mathematics, and chemistry. Each prize carries a cash award of SR750,000 (US\$200,000). Each winner also receives a 200-gram, 22-carat gold medalion and a certificate outlining the work for which the prize is awarded.

Institutions and organizations around the world nominate candidates for the prizes. The formal awards ceremony takes place in Riyadh in March each year.

— Allyn Jackson