Bombieri and Tao Receive King Faisal Prize

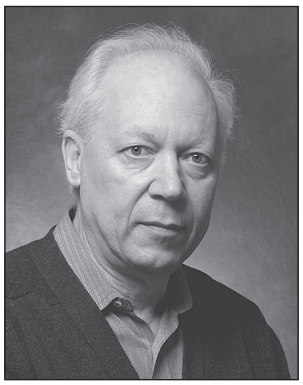

Photo by Cliff Moore.

Enrico Bombieri

Photo by Reed Hutchinson/UCLA.

Terence Tao

The King Faisal Foundation annually presents the King Faisal International Prize to reward dedicated men and women whose contributions make a positive difference, including to scientists and scholars whose research results in significant advances in specific areas that benefit humanity. The prize carries a cash award of approximately US$200,000.

Two mathematicians shared the 2010 prize in science: ENRICO BOMBIERI and TERENCE TAO. The science prize is given alternately in mathematics, chemistry, physics, and biology.

Enrico Bombieri is IBM Von Neumann Professor at the Institute for Advanced Study, Princeton University. He has made pioneering contributions to various branches of mathematics. His work is characterized by originality, power, and clarity of exposition, addressing fundamental and difficult problems in number theory, algebraic geometry, complex analysis, and minimal surfaces. His work ranges from analytic number theory to algebra and algebraic geometry and the partial differential equations of minimal surfaces.

A major contribution has been his work on the large sieve and its application to the distribution of prime numbers. Given an arithmetic progression, the large sieve provides information about the distribution of an arbitrary finite set of integers. Bombieri applied this improved large-sieve method to prove what is now called "Bombieri's mean value theorem", which concerns the distribution of primes in arithmetic progressions.

In 1974 he was awarded the Fields Medal, the highest award in mathematical sciences, for his major contributions in the primes, in univalent functions and the local Bieberbach conjecture, in theory of functions of several complex variables, and in theory of partial differential equations and minimal surfaces—in particular, to the solution of Bernstein's problem in higher dimensions.

In the past decade, his main contributions have been in the active area of Diophantine approximation and Diophantine geometry, exploring questions of how to solve equations and inequalities in integers and rational numbers. Many topics related to prime number theory have potential practical applications to cryptography and security of data transmission and identification.

Bombieri received the 2008 AMS Doob Prize for the book *Heights in Diophantine Geometry*, written with Walter Gubler. The citation read, in part: "The book is a research monograph on all aspects of Diophantine geometry, both from the perspective of arithmetic geometry and of transcendental number theory.... One gets the sense that every lemma, every theorem, every remark has been carefully considered, and every proof has been thought through in every detail. There are well-chosen illuminating examples throughout every chapter. The book is a masterpiece in terms of its original approach, its unrivalled comprehensiveness, and the sheer elegance of the exposition. There can be no doubt that this book will become the basis for the future development of this central subject of modern mathematics."

Bombieri received his Ph.D. from the University of Milan in 1963. He has held positions at the University of Milan, the University of Cagliari, the University of Pisa and Scuola Normale Superiore, Pisa, as well as at the Institute for Advanced Study. Along with the Fields Medal and the Doob Prize, other awards include the Feltrinelli Prize (1976), the Balzan Prize (1980), and the Cavaliere di Gran Croce al Merito della Repubblica, Italy (2002). He is a member of the Accademia Nazionale, Rome; the Accademia Nazionale dei Lincei, Italy; and Academia Europaea and a foreign member of the Royal Swedish Academy and of the French Académie des Sciences. He is a member of the U.S. National

Academy of Sciences and a fellow of the American Academy of Arts and Sciences.

Terence Tao is professor of mathematics at the University of California Los Angeles. He is a world-renowned mathematician working in a number of branches of mathematics, including harmonic analysis, partial differential equations, combinatorics, number theory, and signal processing. He is known for his highly original solutions of very difficult and important problems and for his technical brilliance in the use of the necessary mathematical machinery. Working with Ben Green, he proved there are arbitrarily long arithmetic progressions of prime numbers—a result now known as the Green–Tao theorem.

Tao has shown extraordinary mathematical abilities since early childhood. Born in Adelaide, Australia, in 1975, he was taking university-level mathematics courses at the age of nine, after having scored a 760 on the mathematics section of the SAT at the age of eight. He competed in his first International Mathematical Olympiad in 1986 when he was ten years old. Over three years he won a bronze, silver, and gold medal. At thirteen, he was the youngest gold medalist in the history of the competition and remains so to this day. He received his bachelor's and master's degrees at the age of seventeen from Flinders University. He completed his Ph.D. at age twenty-one at Princeton University under Elias Stein. He was appointed full professor at UCLA at age twenty-four, the youngest to hold that rank at the university.

Tao's areas of research include harmonic analysis, partial differential equations, combinatorics, and number theory. He has held Sloan Foundation (1999–2001) and Packard (1999–2006) fellowships. He was awarded the Salem Prize in 2000 for his work in L^p harmonic analysis and on related questions in geometric measure theory and partial differential equations. He received the Bôcher Prize in 2002 for his breakthrough on the problem of critical regularity in Sobolev spaces of the wave maps equations. In 2006 he received the Fields Medal for his contributions to partial differential equations, combinatorics, harmonic analysis, and additive number theory; he was awarded the SASTRA Ramanujan Prize in the same year. In 2007 he was awarded a MacArthur Fellowship and the Ostrowski Prize, and he received the Waterman Award in 2008. He is a Fellow of the Royal Society, the Australian Academy of Sciences (corresponding member), the National Academy of Sciences (foreign member), and the American Academy of Arts and Sciences. He is an associate editor of the *American Journal of Mathematics* (2002–) and of *Dynamics of Partial Differential Equations* (2003–) and an editor of the *Journal of the American Mathematical Society* (2005–2010) and of *Analysis & PDE* (2007–).