Four Are Given Highest Honor in Mathematics

Courtesy of International Congress for Mathematicians

Terence Tao, a native of Australia, is one of the youngest Fields Medal winners ever at age 31.

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Grigory Perelman, a reclusive Russian mathematician who solved a key piece in a century-old puzzle known as the Poincaré conjecture, was one of four mathematicians awarded the Fields Medal today.

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Grigory Perelman is the most prominent of the medalists, not only because the Poincaré conjecture had ranked among the most heralded unsolved math problems, but also because of his reclusive personality.

The Fields Medal, often described as mathematics' equivalent to the Nobel Prize, is given every four years. The other Fields medalists, announced at the International Congress for Mathematicians in Madrid, are Andrei Okounkov, a professor of mathematics at Princeton; Terence Tao, 31, a professor of mathematics at the University of California, Los Angeles; and Wendelin Werner, a professor of mathematics at the University of Paris-Sud in Orsay.

Dr. Perelman, 40, is known not only for his work on the Poincaré conjecture, among the most heralded unsolved math problems, but also because he has declined previous mathematical prizes and has turned down job offers from Princeton, Stanford and other universities. He has said he wants no part of $1 million that the Clay Mathematics Institute in Cambridge, Mass. has offered for the first published proof of the conjecture.

According to an article in the Aug. 28 issue of The New Yorker, Sir John M. Ball, president of the International Mathematical Union, the organization that chooses the Fields medalists, visited Dr. Perelman in St. Petersburg, where he lives with his mother, to persuade him to accept a Fields Honor, but Dr. Perelman said, "I refuse."

The union decided to bestow a medal on Dr. Perelman anyway.

Beginning in 2002, Dr. Perelman, who was then at the Steklov Institute of Mathematics of the Russian Academy of Sciences in St. Petersburg, published a series of papers on the Internet and gave lectures at several American universities describing how he had overcome a roadblock in the proof of the Poincaré conjecture.

The conjecture, devised by Henri Poincaré in 1904, essentially says that the only shape that does not have any holes and fits

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Wendelin Werner, top, works on problems at the intersection of mathematics and physics. Andrei Okounkov, bottom, was honored "for his contributions bridging probability, representation theory and algebraic geometry."

within a finite space is a sphere. That is certainly true looking at two-dimensional surfaces in the everyday three-dimensional world, but the conjecture says the same is true for three-dimensional surfaces embedded in four dimensions.

Dr. Perelman solved a difficult problem that other mathematicians had encountered when trying to prove the conjecture using a technique called Ricci flow that smoothes out bumps in a surface and transforms the surfaces into simpler forms.

Dr. Okounkov, born in 1969 in Moscow, was recognized for work that tied together different fields of mathematics that had seemed unrelated. “This is the striking feature of Okukovs’s work, finding unexpected links,” said Enrico Arbarello, a professor of geometry at the University of Rome in Italy.

Dr. Okounkov’s work has found use in describing the changing surfaces of melting crystals. The boundary between melted and non-melted is created randomly, but the random process inevitably produces a border in the shape of a heart.

Dr. Tao, a native of Australia and one of the youngest Fields Medal winners ever at age 31, has worked in several different fields, producing significant advances in the understanding of prime numbers, techniques that might lead to simplifying the equations of Einstein’s theory of general relativity and the equations of quantum mechanics that describe how light bounces around in a fiber optic cable.

Dr. Werner, born in Germany in 1968, has also worked at the intersection of mathematics and physics, describing phenomena like percolation and shapes produced by the random paths of Brownian motion.

The medal was conceived by John Charles Fields, a Canadian mathematician, “in recognition of work already done and as an encouragement for further achievements on the part of the recipient.”

Since 1936, when the medal was first awarded, judges have interpreted the terms of Dr. Fields’s trust fund to mean that the award should usually be limited to mathematicians 40 years old or younger.

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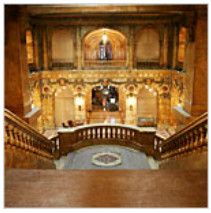

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