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Award for Russian mathematician for solving Poincaré Conjecture

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Grigoriy Perelman cracks 106-year-old dimensional problem

Henri Poincare

New Delhi: The Clay Mathematics Institute (CMI) announced on March 18 the award of its Millennium Prize to Dr. Grigoriy 'Grisha' Perelman of St. Petersburg, Russia, for resolution of the 106-year-old Poincaré Conjecture.

The Poincaré Conjecture, posed by the French mathematician Henri Poincaré in 1904, was regarded as such an important problem in Mathematics that it was identified as one of the seven Millennium Prize Problems by the CMI in 2000. The CMI Award carries a cash prize of $ 1 million for the solution of each problem.

"The [Millennium] Prizes," according to the CMI, "were conceived to record some of the most difficult problems with which mathematicians were grappling at the turn of the second millennium; to elevate in the consciousness of the general public the fact that in Mathematics, the frontier is still open and abounds in important unsolved problems; to emphasise the importance of working towards a solution of the deepest, most difficult problems; and to recognise achievement in Mathematics of historical magnitude."

In 2006 Dr. Perelman, an eccentric genius, had famously rejected the Fields Medal, the highest award in Mathematics, generally regarded as the mathematics equivalent of the Nobel Prize (see Frontline, September 8, 2009). The important difference being that the Fields Medal is awarded only to mathematicians not over the age of 40.

Dr. Perelman had been chosen for the Fields Medal in May 2006 by a committee of nine mathematicians. The Medal citation said: "For his contributions to geometry and his revolutionary insights into the analytical structure of the Ricci flow." His results had provided a way of resolving two outstanding problems in topology: the Poincaré Conjecture and Thurston Geometrization Conjecture. The latter, in fact, contains the Poincaré Conjecture as a special case.

Grigoriy Perelman

The Fields Medal is customarily given at the International Congress of Mathematicians (ICM) of the International Mathematical Union (IMU). In June 2006, Sir John Ball, president of the IMU, approached him to persuade him to accept the Medal. His two days of persuasion were of no avail. On August 22, 2006, Dr. Perelman was publicly offered the Medal during the 2006 Congress at Madrid in Spain. However, Dr. Perelman did not present himself at the ceremony and declined to accept the Medal.

Topology is the branch of Mathematics that deals with fundamental properties of shapes that remain unchanged when the shapes are deformed — that is, bent, stretched, shrunk, moulded, warped or twisted, but not torn.

Dr. Perelman's works have so far not been published in a peer-reviewed journal as the rules for the Millennium Prize require; he had only posted them in electronic form in the public research preprint archive of the Argonne National Laboratory (ANL) www.arXiv.org. However, the mathematics community had felt that the verification of his proof in his e-prints was so extensive and thorough that it was a great deal more than the normal process of peer-review. The CMI governing board had accordingly changed the formal pre-requisites for the award.

A Special Advisory Committee consisting of famous mathematicians — Drs. Simon Donaldson, David Gabai, Mikhail Gromov, Terence Tao (the Australian who had shared the 2006 Fields Medal with Dr. Perelman) and Andrew Wiles (who had proved the famous Fermat's Last Theorem) —

had recommended Dr. Perelman for CMI's Millennium Award. As per the governing rules of the Institute this was approved by its six-member Scientific Advisory Committee and then finally decided by its three-member Board of Directors.

"The resolution of the Poincare Conjecture brings to a close the century-long quest for the solution," said Dr. James Carlson, President of CMI. "It is a major advance in the history of Mathematics that will be long remembered," he added.

Conference

The CMI and the Institut Henri Poincaré (IHP) will hold a conference to celebrate Poincaré Conjecture and its resolution during June 8-9 in Paris. This will be preceded by a public lecture by Dr. Etienne Ghys on June 7.

The 2010 ICM is due to be held in India in Hyderabad during August 19-27. The next round of Fields Medal winners, who are yet to be announced, will be awarded then. A felicitation ceremony during the Congress to mark's Dr. Perelman's achievement is also being proposed.

Not surprisingly, the news till now is that Dr. Perelman has not accepted the Clay Award either. Disillusioned with Mathematics, especially with its ethical standards, he is believed to have quit Mathematics altogether and become a recluse, living with his mother at St. Petersburg on her modest pension.

"It is not people who break ethical standards who are regarded as aliens. It is people like me who are isolated," he had said after declining the Fields Medal.