

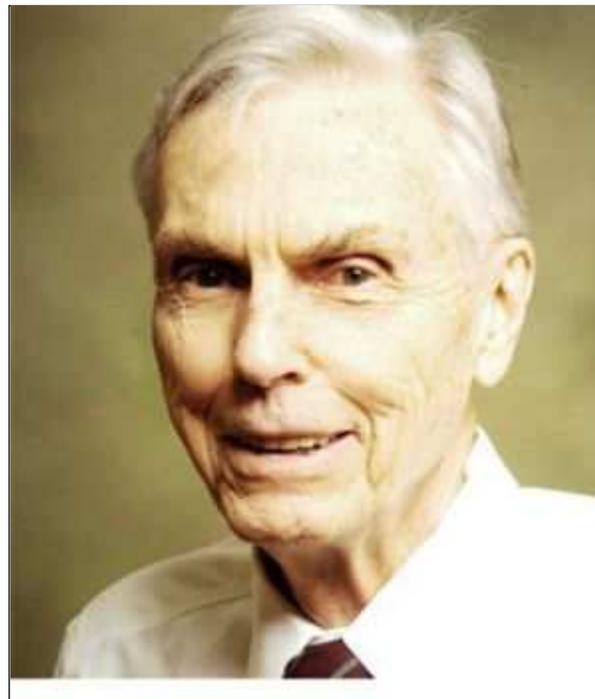
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## **Abel Prize goes to John Torrence Tate**

R. Ramachandran

*“For his vast and lasting impact on the theory of numbers”*



**John Torrence Tate**

New Delhi: The prestigious Abel Prize in Mathematics for 2010 has been awarded to 85-year-old American mathematician John Torrence Tate, one of the most outstanding number theorists in recent times, “for his vast and lasting impact on the theory of numbers.”

This was announced in Oslo on Wednesday by the President of the Norwegian Academy of Science and Letters, Nils Christian Stenseth. The Prize, administered by the Academy, will be awarded at a ceremony in Oslo on May 25.

The Abel Prize, given for outstanding lifetime achievement in mathematics, is named after the great Norwegian mathematical genius Niels Henrik Abel (1802-29), who died at the age of 26. Abel is sometimes compared to Indian mathematical wizard Srinivasa Ramanujan.

Number theory is the study of properties of numbers in general, and integers in particular. It extends from the mysteries of prime numbers to the ways in which we store, transmit and secure information in modern computers. Over the past century, it has developed into one of the most

elaborate and sophisticated branches of mathematics, while at the same time influencing other fields as well. "John Tate is a prime architect of this development," said the Academy's citation.

Number theory may be divided into several sub-areas according to the methods used and the type of questions investigated.

Professor Tate's work mainly belongs to the subfield known as "Algebraic Number Theory." In algebraic number theory, the concept of a number is expanded to "algebraic numbers," which are roots of polynomials with rational coefficients. The domain includes elements analogous to the integers, the so-called algebraic integers.

Professor Tate's mathematical accomplishments have spanned six decades. It is remarkable how many concepts, ideas and constructions in mathematics are named after him and are a measure of his wide-ranging influence in mathematics: Tate module, Tate curve, Tate cycle, Hodge-Tate decompositions, Tate cohomology, Serre-Tate parameter, Lubin-Tate group, Tate trace, Shafarevich-Tate group, Neron-Tate height, to mention a few.

According to the citation, "many of the major lines of research in algebraic number theory and arithmetic geometry are only possible because of the incisive contributions and illuminating insights of Professor Tate. He has truly left a conspicuous imprint on modern mathematics." Even his thesis completed at the age of 25 has become a byword in mathematics as "Tate's Thesis," wherein he evolved new methods to investigate a class of functions called L-functions.

"It's an award that's long overdue," remarked V. Kumara Murty, a Professor at Toronto University and a student of Professor Tate at the Harvard during 1977-82 and who is now visiting the Institute of Mathematical Sciences (IMSc), Chennai. "His contributions are fundamental to number theory and come up everywhere," he said. Professor Murty's doctoral work was concerned with what is known as the Tate Conjecture.

Professor Tate has just retired from his position as Professor and Sid W. Richardson Chair in Mathematics at the University of Texas, Austin. Born on March 13, 1925, in Minneapolis, Minnesota, he received his bachelor's degree from the Harvard College in 1946 and Ph. D. from the Princeton University in 1950 along with Emil Artin, a famous algebraist who made important contributions in algebraic number theory as well. From 1954, he was a professor at the Harvard University for 36 years. In 1990, he accepted his last academic position at Austin.

The Abel Prize was established in 2001 as part of the events marking Abel's 200<sup>th</sup> birth anniversary. Interestingly, the idea of a Prize in honour of Abel was suggested as far back as 1899 by famous Norwegian mathematician Sophus Lie (1842-1899), shortly before his death.

The first Abel Prize was awarded in 2003 to one of the greatest living mathematicians Jean-Pierre Serre.

#### Award for Varadhan

It may be recalled that the 2007 Abel award was given to India-born S. R. Srinivasa Varadhan of the Courant Institute of Mathematical Sciences, New York, for his fundamental contributions to Probability Theory (see Frontline, April 20, 2007).

The selection of the winning candidate is based on the recommendations of an international committee, which consists of five internationally recognised mathematicians and is chaired by a Norwegian. The current value of the prize is 6 million Norwegian Krone (about € 730,000 or \$ 1

million), an amount similar to the Nobel Prize in the sciences, which, however, does not include mathematics.

Beginning with the 2010 International Congress of Mathematicians (ICM) in Hyderabad, to be held during August 19-27, the Congress, which is held once every four years, will have a new lecture series called the Abel Lectures.

They will be sponsored by the Norwegian Academy. The first Abel Lecture will be given by the 2007 Abel award winner Dr. Varadhan.

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