ABEL
PRISEN

The Norwegian Academy of Science and Letters has decided to award the Abel Prize for 2010 to

John Torrence Tate
University of Texas at Austin

“for his vast and lasting impact on the theory of numbers.”

Beyond the simple arithmetic of 1, 2, 3, … lies a complex and intricate world that has challenged some of the finest minds throughout history. This world stretches from the mysteries of the prime numbers to the way we store, transmit, and secure information in modern computers. It is called the theory of numbers. Over the past century it has grown into one of the most elaborate and sophisticated branches of mathematics, interacting profoundly with other areas such as algebraic geometry and the theory of automorphic forms. John Tate is a prime architect of this development.

Tate’s 1950 thesis on Fourier analysis in number fields paved the way for the modern theory of automorphic forms and their L-functions. He revolutionized global class field theory with Emil Artin, using novel techniques of group cohomology. With Jonathan Lubin, he recast local class field theory by the ingenious use of formal groups. Tate’s invention of rigid analytic spaces spawned the whole field of rigid analytic geometry. He found a p-adic analogue of Hodge theory, now called Hodge-Tate theory, which has blossomed into another central technique of modern algebraic number theory.

A wealth of further essential mathematical ideas and constructions were initiated by Tate, including Tate cohomology, the Tate duality theorem, Barsotti-Tate groups, the Tate motive, the Tate module, Tate’s algorithm for elliptic curves, the Néron-Tate height on Mordell-Weil groups of abelian varieties,

Mumford-Tate groups, the Tate isogeny theorem and the Honda-Tate theorem for abelian varieties over finite fields, Serre-Tate deformation theory, Tate-Shafarevich groups, and the Sato-Tate conjecture concerning families of elliptic curves. The list goes on and on.

Many of the major lines of research in algebraic number theory and arithmetic geometry are only possible because of the incisive contribution and illuminating insight of John Tate. He has truly left a conspicuous imprint on modern mathematics.