

# Paul Joseph Cohen Encyclopedia Article

## Paul Joseph Cohen

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# Paul Joseph Cohen

1934-

## American Mathematician

Paul Joseph Cohen is a leader in the advancement of mathematics. In addition to being given the National Medal of Science, he was awarded the Fields Medal—mathematics' highest honor—for his accomplishments with set theory. He solved the first of 23 problems in set theory proposed by David Hilbert (1862-1943) to the Second International Congress of Mathematics in 1900.

Having been intrigued with mathematical studies at an early age, Cohen chose to pursue the field while studying at Brooklyn College between 1950 and 1953. Cohen earned his master's degree in 1954 and his doctorate degree in 1958, both from the University of Chicago. He began teaching mathematics one year prior to receiving his Ph.D. This position was at the University of Rochester in 1957. The following year he began teaching at the Massachusetts Institute of Technology, before spending two years working at the Institute for Advanced Study at Princeton. In 1964 he became professor of mathematics at Stanford University, a position he has held since that time.

Two years following his professorship at Stanford, Cohen received the Fields Medal based on his solution to the continuum hypothesis in set theory. Originally created in 1877 by Georg Cantor (1845-1918), who discovered that there were multiple levels of infinity in numbers, the problem was highlighted by Hilbert in his historic 1900 challenge to mathematicians. Cohen proved that the continuum hypothesis was independent of standard set theory, and that the continuum hypothesis could not be regarded as an axiom of set theory. He arrived at his solution by introducing a technique called "forcing" that revealed his theory of independence. Cohen published his findings in *Set Theory and the Continuum Hypothesis* in 1966. The further use of his technique of forcing has continued to cause revelations in mathematics today.

Cohen's other honors include being awarded the Bocher Memorial Prize from the American Mathematical Society in 1964. This award is given every five years to an outstanding research analyst who has been recognized in any North American journal. Cohen also received the National Medal of Science in 1967. He is a member of the National Academy of Sciences and continues his analytical research in set theory as well as other mathematical areas including harmonic analysis and differential equations.