David Mumford

Science Talent Search Finalist 1953
Fields Medal 1974
MacArthur Fellow 1987

Before he became one of the most honored mathematicians in the country, before he became a leader in reforming how Calculus is taught, before he pioneered mathematical models of the functions of the visual cortex, David Mumford blew up his home-built computer at the 1953 Science Talent Search competition.

By his own admission he was better at theory than practice. “My computer worked in fits and starts, and it finally more or less exploded because the paper tape I was using to program it caught fire from a spark.” With a mathematician, a physician and an astronomer for grandparents, he experienced at an early age what these fields have to offer a curious mind. Then at the Science Talent Search in Washington, D.C. he was further stimulated by the opportunity to meet and talk with working scientists, especially astronomer Harlow Shapley, “a real scientist of whom I knew something.” Participating in the competition “gave me a great feeling that I was really getting somewhere in science, a great boost for my self-confidence.” Mumford earned his Ph.D. in math at Harvard and became a professor there.

He focused first on the field of algebraic geometry for which he was awarded the coveted Fields Medal in 1974. In 1975 he was elected to the National Academy of Sciences. Then in the 1980’s he turned his attention to applied mathematics and the computational problems underlying computer and natural vision. In 1987 Mumford was awarded a prestigious MacArthur Fellowship for his continuing contributions in mathematics.

Mumford left Harvard in 1996 to join Brown University where he is currently a university professor in the Division of Applied Mathematics, specializing in pattern theory. “The aim is to analyze from a statistical point of view the patterns in all signals generated by the world, whether they be images, sounds, written text, DNA or protein strings, spike trains in neurons, time series of prices or weather, etc. Pattern theory proposes that the types of patterns … found in one class of signals will often be found in the others and that their characteristic variability will be similar.”

Current projects include research on object recognition and how to solve problems of perception on a computer. This spring he’ll be teaching *Modeling the World with Mathematics: Clocks, Waves, Chaos and Chance*, designed for non-mathematics majors. “It seeks to show these students something about what is exciting in mathematics and how it is relevant to their lives … the goal is to teach each new discovery in the context of applications which impact our everyday lives.”

The desire to fuel deeper understanding is at the core of his work with the Calculus Reform Movement. “The goals have been to make instruction in Calculus more relevant to the people who are specialized in all kinds of science and engineering and financial professions. … I strongly believe that mathematical instruction should make a very serious effort to try to have real applications in mind.”