

Remembering Bob Devaney

Robert Luke Devaney (April 9, 1948 – November 16, 2025) was a renowned American mathematician, known for pioneering work in dynamical systems, chaos theory, and complex dynamics—especially for his influential results on fractal geometry particularly about the Julia set and the Mandelbrot set. Although I never had the chance to meet him in person, I still feel I knew him well, because my collaborators and I have published more than ten technical papers that directly or indirectly involve “chaos in the sense of Devaney.” For someone like me—a humble teacher and an amateur writer of popular-science essays—Devaney’s importance lies not only in his foundational contributions to mathematics, but also in how powerfully he advanced mathematical education and public outreach.



Figure 1. **Robert L. “Bob” Devaney** (April 9, 1948 – November 16, 2025)

Devaney was born on April 9, 1948, in the town of Lawrence, Massachusetts, and grew up in the nearby Methuen. He was the eldest of eight children in the family. He attended the Central Catholic High School in Lawrence, received his bachelor’s degree from the College of the Holy Cross in 1969, and then entered the University of California, Berkeley for graduate study. He earned his Ph.D. in 1973 under the supervision of the great mathematician Stephen Smale (born 1930). His dissertation, “Reversible diffeomorphisms and flows”, studied the structural stability of “Anosov diffeomorphisms,” a class introduced by Soviet mathematician Dmitry V. Anosov (1936–2014).

After graduation, Devaney held postdoctoral and assistant-professor positions at Northwestern University and Tufts University. In 1980, he joined the Department of Mathematics at Boston University as an associate professor, served as the department chair from 1983 to 1986, and was promoted to full professor in 1986. Devaney taught at Boston University for forty years, and beginning in 2010 he held the Feld Family Distinguished Teaching Professorship. At BU, he founded and led a center for nonlinear dynamics, built an active research group in dynamical systems, and mentored many outstanding students.

In his early years, Devaney’s research focused on hyperbolic dynamical systems and structural stability. Later he concentrated on the relationships among singularities, periodic points, and chaotic regions in complex map iterations. He introduced some basic notions such as “bursting” to describe abrupt changes in a dynamical system’s behavior as parameters vary.

Devaney’s most famous contribution is his foundational work in chaos theory. He proposed the well-known definition of “Devaney chaos,” providing a clear mathematical criterion for identifying chaotic systems. In his definition, a dynamical system is chaotic if it satisfies three conditions: (1) with a set of dense periodic orbits, (2) with sensitivity to initial conditions, and (3) with topological transitivity. Here, topological transitivity means that, for any two nonempty open sets, some points from one set will eventually enter the other under iteration of the system’s map. His classic textbook “An Introduction to Chaotic Dynamical Systems”—first published in 1986 and later reprinted three times—has become one of the standard entry points for learning chaos theory. The book systematically introduces the fundamentals of dynamical systems, the definition and properties of chaos, and a wide range of examples, greatly deepening the understanding of chaotic systems and chaotic phenomena among researchers in science and engineering. In addition, his monographs “A First Course in Chaotic Dynamical Systems” (1992), “Complex Dynamical Systems” (1994), and the “Fractals and Chaos” series coauthored with colleagues have been widely used in undergraduate as well as graduate teaching in mathematics and physics.



Figure 2. Selected books by Devaney

Devaney made many important contributions in topological dynamics, bifurcation theory, and the structural stability of nonlinear systems. He was also one of the key figures in complex dynamics. Together with French mathematician Adrien Douady (1935–2006) and American mathematician John H. Hubbard (born 1945), among others, he helped develop fundamental theory and analytical tools for studying iterations of rational functions in complex dynamical systems and fractal geometry. He systematically studied the topological structures of the Julia set and the Mandelbrot set, revealing deep internal connections between fractal geometry and chaotic dynamics.

Devaney was not only a major scholar in dynamical systems but also an influential communicator of chaos theory. He excelled at making profound mathematics accessible through intuitive geometric reasoning and computer visualization, shaping an entire generation of mathematicians and popular-science writers. Through classes, public lectures, and outreach articles, he often introduced the public to the striking “butterfly effect” and the beauty of fractal images. His greatest passion was passing on his love of mathematics to the younger generation. He believed that by the time students come to university, they might already have missed the best opportunity to appreciate the beauty of mathematics. Among his outreach efforts, he founded and ran for many years the “Math Field Days” at Boston University—events that brought high-school and college students into mathematical games and offered talks at various levels. Particularly admirable is that he also wrote resources specifically for high-school teachers and students, including “Chaos, Fractals, and Dynamics: Computer Experiments in Modern Mathematics” and the series “A Tool Kit of Dynamics Activities”.

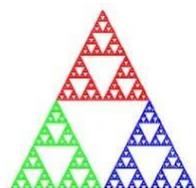
Devaney received many awards, especially for teaching, including the Mathematical Association of America’s Deborah and Franklin Tepper Haimo Award for Distinguished College or University Teaching and Boston University’s Metcalf Award for teaching excellence. In 2009, he was inducted into the “Massachusetts Mathematics Educators Hall of Fame.”

In 2012 Devaney was elected a Fellow of the American Mathematical Society, and from 2013 to 2015 he served as President of the Mathematical Association of America. He authored 125 research papers and published 16 books, and he was invited to give more than 1,600 academic and popular-science lectures across 35 countries on six continents and in all 50 U.S. states. He once humorously said: “My only regret is that I never had a chance to give a talk in Antarctica.”

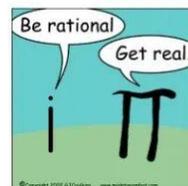
In his personal life, Devaney and his wife Kathleen Ferguson Devaney raised two sons and one daughter. The couple loved opera and often drove from Boston to New York to attend performances at the Metropolitan Opera. They were also sailing enthusiasts and frequently toured the New England coast together on their sailboat, “Cygnet”. Devaney was also an amateur athlete, participating in long-distance swims in Maine and around Nantucket Island. He enjoyed Sudoku—whether on a treadmill, on the couch, or during walks—and never seemed to tire of it. He loved traveling and hoped to explore every corner of the Earth. He also had a quirky habit: every time he gave a talk at a university or college, he collected a coffee mug with a local emblem. Over time, more than 350 different mugs filled his office—interestingly, he did not drink coffee.

In June 2018, Devaney became professor emeritus. When he retired, a large group of students joyfully paraded across the Boston University campus to see him off, screaming "No more F's! No more F's! No more F's! Phinally!!!"

On November 16, 2025, Devaney died at home in Charlestown, Massachusetts, from amyotrophic lateral sclerosis, at the age of 77.



Bob Devaney's Home Page



MA 226 --- Diff Eqs

MA 471 --- Chaotic
Dynamical Systems

MA 771 --- Discrete
Dynamical Systems

Other Courses

Brief Vita

Upcoming Visits
and Lectures



Where do you think this picture was
taken?

Recent Research
Papers

Dynamical Systems &
Technology Project

Java Applets for
Chaos and Fractals

Mandelbrot Set
Explorer

BU Differential
Equations Project

BU Dynamical
Systems Group

Figure 3. Devaney's personal webpage. (<https://math.bu.edu/people/bob/>)

[1] Original Chinese version: <https://mp.weixin.qq.com/s/sli4A0bhcFs2PdHClasSm-w>

[2] LinkedIn: https://www.linkedin.com/posts/miguel-af-sanju%C3%A1n-1aa836238-ive-just-read-the-english-translation-of-activity-7413924952321568768-YCbV?utm_source=share&utm_medium=member_desktop&rcm=ACoAAdS2PJIB9PUuwraXwhRa05KEAQS0LVB3bzg