

Obituary: Howard Taylor, 1937-2025

Howard Milton Taylor III passed away at his home in Towson, MD, on September 5, 2025.

Howard was an inspirational professor whose teaching and mentoring at Cornell and the University of Delaware influenced a generation of graduate students in applied probability and statistics. He contributed to several areas of applied probability including control theory and optimal stopping, and essentially created a whole subfield of reliability theory concerned with load-sharing systems. His most enduring legacy, however, was a series of textbooks on stochastic processes written jointly with Samuel Karlin, that had a great influence on the way this subject was taught at both undergraduate and graduate levels.



Born in Baltimore on May 9, 1937, Howard obtained bachelor's and master's degrees from Cornell and a PhD in Mathematical Statistics from Stanford, advised by Gerald Lieberman. He joined Cornell's Department of Operations Research and Industrial Engineering in 1965, becoming a full professor in 1975, in which year he also became a Fellow of IMS.

The first phase of Howard's research was on sequential probability problems including statistical control theory and option pricing in the financial markets – this was in the period before the Black-Scholes-Merton model became fundamental to mathematical finance. His contributions here included a paper in Management Science on the optimal timing strategy for call or put options, a paper with Benoit Mandelbrot showing how a stable distribution for stock price changes may result from a combination of Gaussian distributions at individual transactions with a random number of transactions, and several papers on optimal stopping. He was especially proud of the paper *A Stopped Brownian Motion Formula* (Annals of Probability, 1975), motivated by the value of an option that is sold when it falls a predetermined amount below its maximum value. Howard's elegant closed-form expression motivated a paper by the British probabilist David Williams, who used it as an example to illustrate new methods based on local time and the Cameron-Martin formula (Séminaire de Probabilités, 1976). This phase of his work also included his first PhD student, Bruce Turnbull (later a professor at Cornell).

A second phase of his work was on the reliability of load-sharing systems, motivated by the emerging field of research on fibrous composite materials. His first paper on this topic, joint with the engineering student and subsequent professor Leigh Phoenix, applied Billingsley's methods of weak convergence to rederive and extend a formula of H.E. Daniels for the strength of a fibrous material under equal load-sharing. Phoenix and Taylor and their

students wrote many papers on corresponding problems for time to failure and under an alternative model known as local load-sharing, more realistic for modern composite materials. By the mid 1970s, Howard was the leader of a large group of probability students including Gary Harlow (subsequently an engineering professor at Lehigh), Wagner Borges (University of São Paulo), Richard Smith (University of North Carolina) and Luke Tierney (University of Iowa, recently co-winner of the Rousseeuw prize for his contributions to R).

Howard's collaboration with Sam Karlin started with a revision of Karlin's *First Course In Stochastic Processes*, followed by their *Second Course In Stochastic Processes* and a more elementary *Introduction to Stochastic Modeling*. These texts amply demonstrated Howard's emphasis on concrete but rigorous formula derivation over abstract mathematical theory, culminating in a 240-page chapter on diffusion processes. Howard believed it was possible to develop all the major results of stochastic calculus without invoking the formalities of measure theory. Although the measure theoretic framework has become the standard foundation for modern stochastic calculus, Howard's approach to diffusion processes provides considerable intuition and motivation that can easily be obscured in more abstract treatments.

In addition to his major works on stochastic processes, Howard made numerous contributions to applied statistics, in areas such as epidemiology, ecology and even a paper on "school rezoning to achieve racial balance" (Heckman and Taylor, 1969), and was a consultant to the PGA Tour.

Howard advocated for women students and professors at a time when women in engineering departments were few and far between. Two of his PhD students were women – Ellen Cherniavsky and Mary (Bauer) Stefano – and he was instrumental in bringing Christine Shoemaker to Cornell, the first woman to be hired into a tenure-track position in Cornell Engineering and a subsequent member of the National Academy of Engineering.

In 1986, Howard moved to the University of Delaware, where he continued research and had several more PhD students, retiring in 1996.

Howard was a talented athlete – as an undergraduate he was goalie on the Cornell Hockey team, and at the age of 43 he ran a local marathon race in Ithaca, winning the masters' division. In retirement he pursued his interests in hunting, fishing, cooking, and swing dancing. He is survived by his second wife, Florence Newman, *professor emerita* of English at Towson University.

I thank Florence, Bruce Turnbull and Amarjit Budhiraja for their input to this obituary.

Richard Smith, University of North Carolina at Chapel Hill