Princeton University

Honors Faculty Members
Receiving Emeritus Status

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The biographical sketches were written by colleagues in the departments of those honored, except where noted.

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Faculty Members Receiving Emeritus Status

Edward Charles Cox

Edward "Ted" Cox, the Edwin Grant Conklin Professor of Biology, has spent forty-seven years as a member of the Princeton faculty. He earned a B.Sc. in microbiology from the University of British Columbia in 1959 and a Ph.D. in biochemistry from the University of Pennsylvania in 1964. He then trained in as a postdoctoral fellow in molecular genetics at Stanford University from 1964 to 1967 before coming to Princeton as an assistant professor in 1967.

During his years at Princeton, Ted made seminal contributions in four major areas of biology: the genetics and population consequences of error rate control during DNA replication in microbial populations, the genesis of large scale spatial patterns in simple developmental systems, the development of new ways to study single molecules in microfabricated environments, and the analysis of single molecular events in living bacterial cells in real time.

One of Ted's publications on the evolutionary consequences of high mutation rates for bacterial populations was based on the senior thesis work of Tom Gibson, Class of 1970, and it appeared in *Science* in 1970. At the time, it was considered by many to be radical and maybe even wrong. It turned out to be an insightful and widely quoted result showing that high mutation rates can increase, not decrease, organismal fitness. This work led to a second surprising result with Lin Chao that was published in *Nature* in 1983: selfish DNA elements also increase the fitness of bacterial populations. During this period, Ted began to study an ancient question—how do organisms get their shape? An important recent insight from this work, based on genetic and numerical experiments with the cellular slime molds, was the realization that coupled oscillating networks of gene products are necessary and sufficient to explain large-scale interaction between individual cells as they form a developmental structure.

Ted's colleague, Bob Austin, realized sometime in the '90s that microfabricated arrays of posts etched into the surface of silicon chips could be used to study the dynamics of single DNA molecules in confined environments. Ted began a long-term collaboration with him using this new experimental paradigm. This work revealed, among other things, that when DNA binding proteins find their target on single DNA molecules, they do so in a very heterogeneous fashion, contrary to the received wisdom from classical biochemical measurements. It seemed clear to Ted from this research that there might also be surprises if single molecules could be imaged and followed in real time in living cells. In a series of influential and widely quoted papers with Ido Golding and Tom Kuhlman, he discovered that both protein and nucleic acid molecules are synthesized in a highly stochastic fashion in live bacterial cells. Moreover, by following individual molecules, it became apparent that the cellular environment behaves very much like a classical maze, with many blind alleys and pockets.

In addition to his scholarship, Ted served the University as associate dean of the college from 1972 to 1977, with a stint as acting dean in 1975. He followed that assignment by serving as chair of the Department of Biology from 1977 to 1987, during which he recruited many of the leading members of today's ecology and evolutionary biology and molecular biology departments.

Ted also was an accomplished teacher. He designed and taught introductory biology courses for many years. Most recently, MOL 215, "Quantitative Principles in Cell and Molecular Biology," was much appreciated by freshmen and sophomores across the University.

Ted contributed broadly to the Princeton community as a scholar, mentor, and academic leader. He always was quick to share his insights, friendship, and wry sense of humor.