

iFAST: The International Forum on Advanced Environmental Sciences and Technology

A series of distinguished seminars by eminent scientists

8 a.m. CST, 9 a.m. EST; 2 p.m. GMT, 10 p.m. China

Wednesday, Feb. 8, 2023



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R. D. Holt is an ecologist particularly known for theoretical and conceptual contributions to population and community ecology, and for fostering the integration of ecology with evolutionary biology. Holt's research examines how species interact, both directly and indirectly, in complex webs, and he addresses the ecological and evolutionary consequences of such interactions, and how such interactions unfold across space, contributing for instance to geographical range limits. He graduated from Princeton in 1973 with a degree in physics, but fortunately each semester took for fun an upper-level course in biology. This allowed him to pursue graduate studies in biology at Harvard, where he received his doctorate in 1979. He then moved to the University of Kansas, where he was on the faculty and a curator in the Museum of Natural History. In 2001 he shifted to the University of Florida to take the titles of Eminent Scholar and Arthur R. Marshal Jr. Chair in Ecological Studies. He is a Fellow of the American Academy of Arts and Sciences as well as the National Academy of Sciences and has been president of the American Society of Naturalists. He is a keen naturalist and has participated in expeditions to many remote corners of the globe.

SARS-CoV-2 Meets the Hutchinsonian Niche

Since March 2020, the world has been living in the throes of a traumatic pandemic. In this talk, I will weave together aspects of understanding the pandemic –and how a failure of such understanding led to degradation in public health responses around the globe – with fundamental conceptual issues in ecology. George Evelyn Hutchinson, in his classic “Introduction to Population Ecology” (1978), characterized the ecological niche as a kind of landscape: instantaneous growth rate (r) when rare, as a function of environmental states, i.e., a niche response surface. In PNAS 2009 I suggested that this conceptualization of the niche could be shored up in several ways: i. dispersal (having to do with scale-dependence in the niche), ii. demographic and environmental stochasticity, iii. density-dependence (direct and indirect), iv. evolution. Understanding these directly pertains to understanding what went wrong in the pandemic. Hutchinson in 1957 had presented another niche concept, which is often conflated with his 1978 niche response surface. I will end by suggesting that we can formalize this alternative conceptualization of the niche as a surface of persistence probabilities (conditioned on time-scales and other relevant factors) across environmental states. Both niche concepts I will argue are useful and provide complementary insights into the natural world.



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