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The Evolution of Novelty by Small Steps and Giant Leaps: A Tale of Two Toxins

Date: **1/31/2020**

Time: **10:30 AM**

Location: **COB1 110**

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Abstract

Evolutionary biology finds itself in a golden age. The genomics revolution and new genome editing technology are providing answers to central questions in evolution that were out of reach even a few years ago. This profusion of information is difficult to integrate with existing theory. On one hand, the Modern Synthesis posits that adaptation proceeds through small, gradual steps up adaptive peaks, a view largely supported by these new data. On the other, horizontal gene transfer, hybridization, and symbioses result in large, sudden leaps to previously inaccessible fitness peaks, processes largely ignored by the Modern Synthesis. I will share two empirical studies from my laboratory that suggest these seemingly disparate adaptive processes are two sides of the same coin. Diverse insects have co-opted two different toxins—heart poisons from plants and DNAses from bacteria—as defenses against natural enemies. I will show how these remarkable adaptations require both small steps and giant leaps to explain their origin and elaboration.

About the Speaker

Dr. Noah Whiteman is an evolutionary biologist who focuses on the genetics and evolution of toxic plants and the insects and microbes that attack them. Dr. Whiteman joined the Department of Integrative Biology at the University of California, Berkeley as an Associate Professor in January 2016 where he runs a research laboratory, teaches undergraduate and graduate students and trains postdoctoral scholars (www.noahwhiteman.org). He is the first Chair of the Committee on Equity and Inclusion of the Genetics Society of America and is passionate about using his experience as a first-generation and LGBTQ+ person from a rural farming community to amplify and lift the many voices in STEM who feel that there is not a place for them at the table of science. He was previously an Assistant and then Associate Professor of Ecology and Evolutionary Biology at the University of Arizona from 2010-2016. Dr. Whiteman's postdoctoral training in molecular biology and genomics of host-parasite interactions was at Harvard University and Massachusetts General Hospital through an NIH fellowship in 2007-2009. His Ph.D. in biology is from the University of Missouri-St. Louis and his M.S. in entomology is from the University of Missouri-Columbia. His laboratory is funded by an R35 Outstanding Investigator Award from the National Institutes of Health.