Departments of Biology and Molecular Biosciences Seminar Series

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“Evolutionary drivers of phenotypic and functional diversity across biological scales”

Phenotypic and functional diversity are the raw material acted upon by natural selection, and to the extent that they are controlled by genomic variation, represent the potential for evolutionary adaptation. However, the mechanisms generating diversity remain poorly understood. My research seeks to address this gap by studying the selective forces acting upon diversity and the genomic and transcriptomic mechanisms that regulate the expression of diversity. First, I study the evolution of anti-predator coloration. This integrative research spans population biology to macroevolutionary studies and has revealed that spatially and temporally heterogeneous selection has driven dynamic color evolution across the vertebrate tree of life. Second, I study the mechanisms generating diversity in sexual dimorphism by integrating field ecology and laboratory studies of physiology and transcriptomics. My research has revealed that sex-specific transcriptional regulators are coupled to gene expression to facilitate the evolution of sexual dimorphism among lizard species. Finally, I am studying adaptation to the biophysical environment in experimental populations of anole lizards on islands in Lake Gatun, Panama. This research focuses on the relative roles of evolutionary adaptation and phenotypic plasticity of physiological traits in the response to a changing climate. The ultimate goal of this integrative research is to understand the evolutionary and functional mechanisms generating diversity across biological scales.