Biology Seminar

12:30 - 1:30 pm
Friday, December 3, 2021
Via ZOOM

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The Evolutionary Maintenance and Loss of Phenotypic Plasticity in Membranes and Metabolism

Environmental heterogeneity is theorized to lead to the evolution of phenotypic plasticity that maintains organismal performance and fitness across environments, particularly those that change predictably with the seasons. I will discuss our insights on the evolutionary maintenance of plasticity in cell membrane physiology and metabolism across multiple ectotherms in response to thermal and seasonal environmental heterogeneity, as well as the potential costs that may lead to the loss of plasticity in the absence of this heterogeneity. Our work on cell membrane thermal plasticity in lab-evolved and wild populations of the fruit fly *Drosophila* supports both physiological models and evolutionary theory for phenotypic plasticity and indicates that plasticity is likely to be lost in the absence of environmental heterogeneity. An explicit test for the loss of plasticity in populations of the North American monarch that have dispersed to tropical environments suggest that some of this lost plasticity may be involved in maintaining metabolic homeostasis across seasonal rearing environments. I will discuss this result in light of data from both fruit flies and the New Zealand mud snail where we have dissected the role of mitochondrial-nuclear interactions in thermal plasticity (and homeostasis) of metabolic rate.