

Friday, 20 July 2018 | **11am** | DBS Conference Room 1

Hosted by Prof Peter Ng



Theoretical models of tropical biodiversity

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Tropical ecosystems are archetypal complex systems: they arise from a dizzying variety of interactions between thousands of constituent species. How can we make sense of such systems? Can we understand the mechanisms that give rise to such diversity? Can we predict the effects of human activities on ecosystems? As a theoretical ecologist, I use conceptual, mathematical, computational and statistical tools to answer such questions. This talk will be based on two major research projects from my lab.

Firstly, I will focus on the fundamental question of what mechanisms maintain the high species diversity of tropical ecological communities at local scales, e.g., the 300 tree species in 2 ha of old-growth forest at Bukit Timah. I will propose a resolution of the long-standing question (known as MacArthur's paradox) of whether maintenance of such high diversity at local scales is possible through local mechanisms alone (e.g., resource niches) or whether local diversity maintenance relies on continued immigration from much larger regional scales.

Secondly, I will focus on the more applied question of how many species are lost when a natural landscape is cleared and fragmented. For example, how many tree species has Singapore lost through deforestation and habitat fragmentation since 1819? Existing approaches to this problem generally ignore the spatial pattern of habitat fragmentation. I will present a set of new easily applied formulas that account for fragmentation and lead to more robust estimates of species loss.