TMSI Tropical Marine Science Institute
National University of Singapore

# RESEARCH SEMINAR

## Tapping the ecological resilience potential of a photosymbiotic animal

**By Dr. Lee Li Keat**
Tropical Marine Science Institute, National University of Singapore

**Date: Thursday 23 Oct 2025**
**Time: 3 - 4 PM**
**Format: Hybrid**
Attend in person at: TMSI Conference Room, S2S Building, No. 18 Kent Ridge Road, Singapore 119227
**Please register:** https://shorturl.at/5pB28

**ABSTRACT**:
Giant clams and corals may look very different, but they share something remarkable — both organisms are able to harness the energy of the Sun through photosymbiosis. They live in partnership with microscopic algae, photosynthetic dinoflagellates from the Family Symbiodiniaceae. This phenomenon helps explain what is known as the Darwin Paradox — the mystery of how coral reefs, among the most productive and species-rich ecosystems on Earth, can flourish in nutrient-poor tropical oceans. However, this partnership has an Achilles' heel: as the ocean becomes warmer, more acidic and less oxygenated, corals and clams suffer from bleaching, which is a breakdown of the symbiosis that leaves their tissues pale or white. Yet nature offers hope. It has been found that some corals and clams host heat-tolerant communities of Symbiodiniaceae, enabling them to recover faster or even withstand stressful conditions. These naturally resilient partnerships reveal the potential for adaptation and survival in a changing ocean. Building on these lessons, scientists are exploring innovative approaches inspired by ecological resilience — from screening for heat-resistant genotypes and thermal priming, to microbiome-based solutions involving beneficial bacteria and Symbiodiniaceae, and even experimental evolution to cultivate hardier symbiotic systems. In this talk, Li Keat will share how these resilience potentials can be uncovered and applied, drawing insights from the reef environments of Malaysia and Singapore.

**About the Speaker:**
Li Keat is a molecular ecologist deeply interested in photosymbiosis, looking at questions such as:
1. Diversity & adaptation: How broad is the spectrum of animal–Symbiodiniaceae partnerships, and what are the underlying genetic or physiological adaptations
2. Ecophysiology under stress and environmental memory: Using corals as a model, how do thermal extremes disrupt host–symbiont physiology, and what mechanisms confer resilience or susceptibility, and does environmental memory works?
3. Experimental evolution for reef restoration: Can we harness directed evolution of Symbiodiniaceae to select heat-tolerant strains, offering a scalable strategy to bolster coral survival under climate change?
He is currently Research Fellow on the NUS-NTU project "Enhancing urban coral reef resilience to climate change across biological scales" funded by the Marine Climate Change Science (MCCS) programme.

**Seminar Host: Dr Lionel Ng**