NUS National University of Singapore | Department of Biological Sciences, Faculty of Science

ON-SITE BIOLOGY COLLOQUIUM

Friday, 16 Oct 2026 | 4 pm | S3 05-02 Conference Room 1

Hosted by Assoc Professor Huang Danwei

Map to Block S3

The role of microbial communities in tropical coastal resilience to maritime oil spills



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Oil spills can cause rapid and severe disruption to coastal ecosystems, but the processes that enable these environments to recover remain poorly understood, particularly in the tropics. The 2024 Marine Honour oil spill in Singapore provided a rare opportunity to investigate how naturally occurring microbial communities respond to such disturbances and contribute to ecosystem recovery. Combining field monitoring, laboratory experiments, and genome-resolved analyses, we found that indigenous microbes mounted a rapid response to oil contamination. Hydrocarbon-degrading microorganisms increased after the spill, with the capacity to break down a wide range of petroleum compounds. Remarkably, these functional signatures persisted for more than six months after hydrocarbons were largely removed, suggesting an ecological memory that could strengthen resilience to future disturbances. Experiments further showed that microbial activity was the dominant mechanism of oil removal, exceeding abiotic losses by an order of magnitude. Degradation occurred with and without oxygen but was substantially faster under oxygenated conditions. Together, our findings reveal microbial communities as a natural defence and recovery system in tropical coastlines and highlight their potential to inform nature-based spill response, environmental monitoring, and strategies for building coastal resilience.

About the Speaker

Professor Stephen Pointing earned his PhD from the University of Portsmouth and with a scholarship to the Bermuda Institute of Ocean Sciences. He is an environmental microbiologist whose research combines microbial ecology, genomics, and environmental systems science to investigate the role of microorganisms in maintaining ecosystem resilience under environmental stress and disturbance. His current work focuses on tropical marine and hydrothermal ecosystems, with an emphasis on understanding microbial responses to environmental change and their contributions to ecosystem recovery.