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Chorus of the Ocean: Exploring Marine Biodiversity and Ecosystem Dynamics through Underwater Soundscapes



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Time: 2024. 11. 21 Thu. 15:00

Venue: Auditorium, 1st Floor,

Interdisciplinary Research Building

跨領域科技研究大樓1樓演講廳

Host: Dr. Mao-Ning Tuanmu 端木茂甯副研究員



Abstract

Sounds are ubiquitous in the ocean, generated by diverse marine life for communication, navigation, and foraging, as well as by geophysical events and human activities. This rich acoustic environment, or underwater soundscape, offers a unique perspective for studying marine biodiversity and ecosystem health. My research as a soundscape ecologist focuses on uncovering ecological processes hidden within these soundscapes, particularly those often overlooked by traditional survey methods. Recent advances in autonomous sound recorders have also expanded our ability to monitor soundscapes over extended periods and broad spatial scales, opening up opportunities to study the dynamic interplay of biological, environmental, and anthropogenic activities within marine ecosystems. In this presentation, I will discuss our recent progress in three key areas: (1) the development of advanced machine learning tools for acoustic analysis, (2) investigations of phenological patterns in marine soundscapes, and (3) the application of soundscapes to inform conservation management strategies. Our findings highlight the potential of underwater soundscape monitoring as a critical tool for assessing the diversity of marine ecosystems, an essential component of biodiversity. Through international collaborations, such as the Ocean Biodiversity Listening Project, and the integration of AI-driven soundscape analysis, we are pioneering approaches to model the spatio-temporal dynamics of soundscapes, link acoustic diversity to biological diversity, and assess changes in social-ecological processes. This work represents a promising pathway for leveraging ecoacoustics to address pressing conservation challenges in the Anthropocene and promote the sustainability of marine ecosystems.