TMSI Tropical Marine Science Institute
National University of Singapore

RESEARCH SEMINAR

Enhancing Sonar Capability through Deep Learning with Weak Dependence on Data

By Dr Chi Cheng,
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Date: **Wednesday 15 January 2025**
Time: 3 - 4 pm SGT
Format: ONLINE – register to receive the link
Host: Dr Wu Shuangshuang
Registration: https://shorturl.at/xVQhB

ABSTRACT Deep learning has showcased remarkable capabilities in various data-rich applications, yet its application to sonar signal processing faces challenges due to limited data availability. Can deep learning still enhance sonar performance with limited data? The answer is "Yes." In this talk, we present two case studies demonstrating the potential of deep learning in sonar applications. The first focuses on synthetic aperture sonar, where our neural network-based approach achieves significantly higher accuracy in motion estimation compared to traditional methods, resulting in improved image reconstruction. The second highlights tonal enhancement in passive sonars, showcasing an autoencoder-based enhancer that operates effectively without extensive pre-training. This method delivers superior signal-to-noise ratio gains, surpassing classical adaptive enhancers.

About the Speaker:
Dr Cheng Chi is a senior research scientist at the Institute of Acoustics, Chinese Academy of Sciences, and a professor at the University of Chinese Academy of Sciences. His research focuses on sonar imaging signal processing, acoustic signal processing for AUVs, underwater acoustic communication, and ocean observation instrumentation. Dr. Chi earned his Ph.D. in signal and information processing from Peking University in 2016. From 2016 to 2019, he was a Research Fellow at the Acoustic Research Laboratory, National University of Singapore. He has authored one monograph, published over 80 papers, and led several innovation projects funded by the National Natural Science Foundation of China.