

Hydrotwin: An Acoustics Digital Twin of the Ocean

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Host: Koay Teong Beng

Registration: [Zoom Link](#)



ABSTRACT:

Hydrotwin introduces the first Acoustic Digital Twin of the Ocean, coupling real-world acoustic observations, dynamic ocean environmental representations, physics-based underwater acoustic modelling, and AI-driven acoustic intelligence. A globally distributed network of more than 100 Hydrotwin (HT) sensors provides real-world acoustic observations across diverse marine environments. These data are integrated with bathymetry, water-column and seabed properties, oceanographic information, and acoustic propagation models to represent spatially and temporally varying underwater sound fields. AI-based detection, classification, and tracking further enable the identification and continuous assessment of acoustic sources and events. This presentation will introduce the Hydrotwin architecture and its integration of global sensing, environmental and acoustic modelling, and AI-based perception, providing a foundation for predictive acoustic modelling, virtual experimentation, and intelligent monitoring of underwater activity across the world's oceans.

About the Speaker:

Guilherme received his Msc in Aerospace Engineering in IST, Technical University of Lisbon in 1999 and Phd on marine propellers and underwater noise from [MARIN](#) in the Netherlands in 2005. He joined MARIN's R&D department, where he founded open-source, community-based CFD code [ReFRESCO](#), and coordinated all CFD developments at MARIN from 2016 to 2019. He then returned to Portugal as the CSO of Renewable Energy Institute WavEC, and led the HPC and Data Science team. In 2021, he founded blueOASIS ([Blue Ocean Sustainable Solutions](#)), a start-up dealing with Industry 4.0 tools for Ocean Sustainability, Renewables and Underwaters Acoustics and developed the first underwater acoustics [digital twin of the Ocean](#). blueOASIS has offices in Portugal and Azores and thrive to accelerate our Oceans Protection.