

THORNTON LAB

[Ocean technology bringing our frontiers closer]

Center for Integrated Underwater Observation Technology

Underwater Photonics

Graduate School of Frontier Sciences
Department of Ocean Technology, Policy and Environment

<http://ocean.iis.u-tokyo.ac.jp>

What we do

We develop autonomous marine robotic, sensing and intelligence capabilities that address bottlenecks in the flow of information from data collection to human insight. Our focus is on bridging the practical and theoretical state of the art in support of marine science.

What's the ocean to you and me?

The ocean produces half the oxygen we breath. A growing proportion of the food we eat and the energy we rely on comes from the ocean. Conservation and sustainable use of its resource is a globally recognized sustainable development goal.

What's the ocean to robotic sensing?

Electromagnetic waves cannot propagate far in water and so robots in the ocean have extremely limited wireless communication bandwidth and optical sensing range. Therefore, robots need to get close to their targets, interpret their observations and decide what they need to do independently in realtime, without relying on human support.



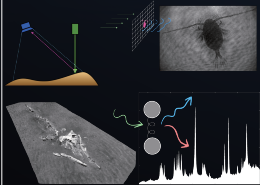
Robotics

Deployment of autonomous vehicles with imaging systems and in situ chemical sensors to survey deep-sea ecology, minerals and pollution.



Sensing

Structured light for wide-area seabed mapping, microparticle imaging using holography and chemical analysis using laser spectroscopy.



Insight

Physics and location guided machine learning to extract information about seafloor and water column ecology, minerals and pollutants.

