

Two master projects in oceanography or applied mathematics - wave measurements around the globe

For nineteen months, Statsraad Lehmkuhl will sail over 55 000 nautical miles and visit 36 ports worldwide. The One Ocean Expedition aims to create attention and share knowledge about the crucial role of the ocean for sustainable development in a global perspective.

Statsraad Lehmkuhl will serve as both a sail training ship and a state-of-the-art research vessel. Using advanced equipment, students and scientists will conduct research and monitor the sea throughout the voyage. Specialized study programs, focusing on sustainability and young leadership will be held on board. For details on the expedition, see <https://oneoceanexpedition.com/>

The Norwegian Meteorological Institute and the University of Oslo will contribute to the scientific programme with wave measurements using a radar probe mounted in the bow of the ship in addition to standard meteorological observations. Processed data will be shared in real time, while raw data will be stored for later analysis. The wave data will be suitable for verification of satellite observation and wave models. We intend to have two master students and supervisors onboard for field work during some lags (about 2-3 weeks), probably in the Caribbean in November/December 2021.

Wave data will be presented in real time in a portal developed by Kongsberg Maritime. We plan to present the data together with wave model and satellite products from Copernicus Marine Environment Monitoring Service (CMEMS).

The project will have a high outreach with TV2 and NRK as media partners. It is endorsed by the UN Decade of the Ocean, UNESCO, and the Intergovernmental Oceanographic Commission (IOC). It is also supported by the Norwegian Government. All major Norwegian marine research institutions will participate.

We propose two master projects related to the expedition:

1. Working on the new measurement technique and analysis of the observational data.
2. On verification of wave model products and satellite observations.

The master project can be connected either to the University in Bergen or the University in Oslo.

If you are interested in these master projects, please contact Lars R. Hole (lrh@met.no) (MET/Bergen) og Atle Jensen (atlej@math.uio.no).

Project 1: what you are interested in, and what you will learn about:

- the science behind wave statistics, Gaussian sea states, and wave spectra
- interest for hardware, instrumentation, and in-situ measurements
- experience using (ideally), or at least interest to learn, about both Python and C++

- development of robust measurement systems, data fusion between different sensors

Project 2: what you are interested in, and what you will learn about:

- data management - handling data products and metadata in line with the FAIR guiding principles for scientific data management
- Using products from the Copernicus Marine Environment Monitoring Service (CMEMS) including data from satellite remote sensing and model simulations
- experience using (ideally), or at least interest to learn, about both Python and C++
- Using Python scripts for satellite product verification.