# Interpretation of satellite measurements over the ocean

Satellite measurements over the ocean are critical to monitor the health status of the Earth's ecosystem. Since the late 1970s, an improving fleet of spacecraft has helped improving our understanding of the marine ecosystems, the ocean biogeochemistry, the details coastal habitats, and potential hazards. From a scientific perspective, these results are achieved by uncovering the physical relationships that link the satellite image to the optical properties of the ocean and its constituents, both of organic and inorganic nature. For all these reasons, an accurate knowledge of the continuing performance of the spaceborne sensors is fundamental to guarantee high quality of the products released to the community.

Our group benefits from a series of unique instruments whose measurements can be used to understand and cross-check the satellite data. In particular, we deploy advanced radiometers and spectropolarimeters both on fixed platforms (the Long Island Coastal Observatory, part of a world-wide network) and research vessels during NASA and NOAA scientific missions. All these "ground-truth" measurements of light at different wavelengths are to be interpreted as a function of the atmospheric and oceanic conditions, and can be used to model different contributions to the total signal measured simultaneously by the downward-looking satellites (such as the NASA MODIS and the NASA/NOAA VIIRS sensors).

We are seeking students interested in learning the basics of Earth's observations from space, and who will participate in the selection and processing of suitable satellite imagery, and in the statistical analysis of radiances and derived ocean and atmospheric products at several world locations. Topics to which the selected students will be exposed include:

- Elements of orbital mechanics regarding environmental polar-orbiting satellites
- NASA MODIS and NASA/NOAA VIIRS satellite imagery download and visualization
- Satellite imagery quality control
- Data extraction from satellite granules
- Data modeling through computer simulations
- Introduction to geophysical data analysis tools (Matlab or similar)