

## 6 month internship

Studio SPERI  
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- ✓ Modeling / Oceanography
- ✓ Coastal Engineering
- ✓ Data science and Machine Learning

Start in Spring 2024

# Application of ML techniques in an extensive ocean modeling chain

## Description of the host company

SPERI SPA is an engineering and architecture company based in Rome. The current open position is meant to be located in Bari, Apulia, within the maritime branch. The young team that composes this entity has been formed to meet the needs of a specific project related to the Apulia region. Since the project is R&D&I-focused, it is expected that project outcomes will be presented / published in workshops/conferences/papers.

## Assignment project

You will be assigned to the "Sea Smart Eye" Project, which consists of the development of a web portal for accessing marine weather data worldwide : [the-oceans.org](http://the-oceans.org). This portal will allow, on the one hand, to visualize the forecasts of marine weather conditions (waves, currents, sea level rise, surges, temperature, salinity..) but also to give qualitative indications for the various stakeholders of the "Blue Economy" (ports, government institutions, NGOs, fisheries and coastal communities...). The WebGIS portal allows accessing third parties data but also data generated by our team using the TELEMAC hydrodynamic modelling suite. The model is empowered by the use of different databases (hereafter DBs) either as input (bathymetric, topographic and atmospheric data) or to be corrected and validated (in-situ measurements: i.e. buoys, level gauges, or remote sensing: i.e. satellite data). A Python framework is being developed to allow the use of these different DBs as a forcing (i.e. model input), therefore to process model results.

## Detailed description of the mission entrusted:

The internship will focus on improving the various steps of the modeling chain, for instance by substituting or enhance them with ML techniques. During this internship initial phase a mentoring about the in-house modelling suite and the current state of the art will be provided. This said, the following objectives are therefore intended to provide a feel for what the actual scope of the internship will be, but it is expected that this will be balanced by the project aims and most importantly personal skills, attitude and interest of the candidate:

- Validation and calibration of the existing hydrodynamics models and chain of models
- Improvement of the modelling chain, incorporation of ML/DL
- Development of the models
- Pre- and post- processing of model's data.

Candidates should have a high level in English (TOEIC/TOEFL). Since the candidate will be working with Python, familiarity with this language is important. Knowledge of R (for statistics) and Fortran (for physical simulations) would be a plus.

The project's technicity, alongside with a wide span of activities, make this internship a step-up for any candidate curious about the fields of meteorology/oceanography/maritime engineering. With a close-up to Big-Data, GIS, data science and Machine Learning.