

# Internship – Validation of Wind Resource Model Chain

3E – Brussels  
www.3E.be

## Background

Development of new wind farms require accurate modelling of the wind climate to identify the most suitable areas for siting and to estimate the project yield. This is typically achieved by running a multi-scale wind flow model chain to simulate the wind resource over the area of interest.

Assessing the skills of the model chain to simulate the wind resource is key for further improvement but also crucial to evaluate the uncertainty in the estimations, and therefore the risk associated to a new wind farm project. Evaluation of the uncertainty requires several on-site measurements (i.e., tall meteorological masts recording wind speed, wind direction, turbulence intensity, etc.) to be compared with the model chain outputs to derive key performance indicators such as model bias & correlations with measurements.

## Function

3E has developed its own wind resource modelling solution in the past years and is looking for a motivated intern to help the R&D team in the development of a consistent validation framework. This validation framework aims to standardize and automate the workflow for evaluating uncertainty of the simulated wind resource. This will be achieved by comparing wind model chain outputs with on-site measurements in different atmospheric and site complexity to derive meaningful performance metrics. The key results should be easily interpretable by creating powerful visualisations and standard reporting.

You will be part of 3E's R&D team and will have full support and guidance from experienced researchers. The main tasks will include:

- Build-up a database of internal & external wind resource measurements
- Definition of relevant key performance indicators (e.g. rmse, bias, sde, emd, etc.)
- Support the development of the validation framework in Python (data processing, metrics calculation, data visualisation & reporting, etc.)
- Collaboration with leading research institutes in impactful national & European projects
- Contribution to the development of innovative wind resource modelling solutions

The tasks will require at least 4 months of trainee participation, with possibility of extension to 6 months.

## Profile

- Bachelor degree (& busy with Master studies or Master graduates looking for first work experience) in Data Science, Engineering, Atmospheric Sciences or similar
- Strong interest in data processing & visualisation
- Interest in the sector of renewable energy

## Skills

- Strong programming skills in Python
- Masters standard Python ecosystem for data science: Pandas, Numpy, Scipy, Xarray, Matplotlib, Seaborn, Bokeh, Plotly, etc.
- Strong background in statistics and familiar with meteorological time series
- Knowledge of atmospheric modelling / meteorology is a plus
- Solution-oriented and practical, end-to-end minded
- Curious, eager to learn quickly
- Able to work in team and autonomously
- Fluent in English (oral and written)

## Offer

In addition to a stimulating atmosphere in a young and highly motivated group of people, 3E offers:

- a 6 months internship in Brussels, starting as soon as possible
- Sustainable transport: Easy access with public transport, 100% reimbursement of public transport fare
- An international environment: projects in over 40 countries worldwide, colleagues of over 20 nationalities