# Fondo Sociale Europeo Plus 2021/2027

# FSE+

## Sportello 2025 P.S. 20/24

## Sostegno alla realizzazione di dottorati di ricerca

With Decree No. 9526/GRFVG of February 28, 2025, the Friuli Venezia Giulia Region published the Notice regarding the submission of operations for Specific Program No. 20/24, which aims to support higher education through the realization of PhD programs.

Specific Programme 20/24, through the funding of doctoral scholarships, contributes to the achievement of the objectives of the Sustainable Smart Specialisation Strategy (S4). It supports the development or strengthening of integration with the regional production system and/or research organisations, through coordination and collaboration mechanisms with regional enterprises or research bodies, or by leveraging the potential for technology transfer of processes, products, applications, or, more broadly, research outcomes.

- Sportello **2025**
- **Ciclo 41**
- CUP **J93C25000640008**
- Progetto **2025/6525/16**

Dottorato in **Industrial and Information Engineering**

**"Development of models/digital twins for predicting and controlling the environmental impact of maritime navigation in an operational environment"**

The research project is aimed at the development of probabilistic simulation methodologies capable of accurately predicting and managing the risk associated with the environmental impact of navigation. In particular, the focus will be on the route planning phases of ships with a lead time so large as to not allow the use of weather forecasts (hence the need to use a probabilistic approach). The models, presumably of a grey-box type, will be capable of considering environmental conditions alongside aspects related to exogenous or human factors and will be developed and validated with the support of historical data.

The methodology includes:

1. Collection and analysis of historical data on fuel consumption/energy demand and on the operational conditions of the ships.

2. Development and calibration of predictive models, validated through historical data.

3. Implementation of a digital twin/model of the ship for the prediction of emissions.

The expected result is the development and validation of a methodology to define a digital model/twin of the ship to be used for the probabilistic prediction over long timescales of the pollutant emissions of existing and/or designed ships, or to support the crew's decisions during navigation.