

# EU-CONEXUS ENABLES 2025: PhD Subjects

## Selected PhD Subjects and Collaborating Institutions

The selected subjects and their collaborating institutions are:

1. **Harnessing Algae-Derived Biostimulants to Enhance Crop Resilience and Productivity: A Multi-Omics and Digital Twin Approach**

*Collaborating institutions:* Agricultural University of Athens and Catholic University of Valencia

Name of the widening partner university supervisor (Agricultural University of Athens):	Name of the non-widening partner university supervisor (Catholic University of Valencia):
Dr. Fletmetakis, Emmanouil	Dr. De Luis Margarit, Ana
Dr. Bartzanas, Thomas	Dr. Chirivella Martorell, Jeronimo

This PhD project investigates the use of microalgae-derived extracts as novel biostimulants to enhance crop resilience and productivity under different stressors. Employing a multi-omics approach, crop monitoring, biochemical profiling, and digital twin modeling, the research will optimize microalgal biostimulant application. The work will involve microalgae cultivation, biochemical and molecular characterization, microbiome analysis, extract production, and assessment of their effects on crop performance. A Digital Twin will be developed to simulate crop responses to various biostimulant treatments. Co-supervised by the Agricultural University of Athens and the Catholic University of Valencia, the project presents an exciting opportunity to advance sustainable agriculture and precision farming through the application of cutting-edge biotechnology and digital tools.

2. **Multi-Layered Digital Twin for Sustainable Coastal Built Environment**

*Collaborating institutions:* Frederick University and University of Rostock

Name of the widening partner university supervisor (Frederick University):	Name of the non-widening partner university supervisor (University of Rostock):
Dr. Paris Fokaides	Dr. Joern Ploennigs

The PhD thesis "*Multi-Layered Digital Twins for Sustainable Coastal Built Environment*" focuses on developing and validating a Digital Twin framework to optimize energy performance, smart operation, and climate resilience of buildings in coastal areas. It will integrate BIM, IoT, AI-driven analytics, and predictive simulations to address specific coastal challenges such as humidity, salinity, and extreme weather. The research is a collaboration between Frederick University (Cyprus) and the University of Rostock (Germany) under the EU-CONEXUS ENABLES framework, contributing to the advancement of sustainable coastal urban development through open science, real-world validation, and interdisciplinary innovation.

3. **Hiking 4.0: The Digital Transformation of Hiking and its Impact on the Sustainable Management of Natural Parks in Coastal or Peri-Urban Areas**

*Collaborating institutions:* University of Zadar and Catholic University of Valencia

Name of the widening partner university supervisor (University of Zadar):	Name of the non-widening partner university supervisor (Catholic University of Valencia):
Dr. Ana Pejdo, Dr. Ana Simunic	Dr. Pablo Vidal Gonzalez

This PhD project studies how new digital technologies are changing the way people hike and interact with nature, especially in protected coastal and peri-urban areas. It will analyse how apps, social media, and AI-based recommendations are affecting traditional hiking clubs, visitor behaviour, and park management. Using surveys, interviews, focus groups, and direct observation, the research will provide insights into how to better manage and protect natural parks in a digital era. Co-supervised by the University of Zadar and the Catholic University of Valencia, the project aims to help park

managers adapt to these changes, promoting sustainable tourism, rural development, and environmental conservation.

#### 4. **Development of a Digital Twin for Ship's Diesel Engine Operating on Alternative Fuels**

*Collaborating institutions:* Klaipeda University and University of Rostock

Name of the widening partner university supervisor (Klaipeda University):	Name of the non-widening partner university supervisor (University of Rostock):
Dr. Paulius Rapalis	Dr. Stefan Ludtke

This PhD project focuses on creating a digital twin of a diesel engine used in small fishing and recreational boats, to study how alternative fuels like biodiesel or synthetic e-fuels perform in real marine conditions. Using real-time sensor data, AI models, and edge computing, the project will simulate engine performance, emissions, and maintenance needs. The aim is to help shipowners, policymakers, and industries transition to cleaner fuels more easily and cost-effectively. The work is co-supervised by Klaipeda University and the University of Rostock, offering hands-on laboratory experiments, advanced digital modelling, and strong links with the maritime sustainability sector.

#### 5. **Enhancing Energy and Environmental Efficiency through Integrated Parametric and Agent-Based Modelling for Bio-Mimetic Design in Structural Components (E3-BioMod)**

*Collaborating institutions:* Technical University of Civil Engineering Bucharest and South East Technological University

Name of the widening partner university supervisor (Technical University of Civil Engineering Bucharest):	Name of the non-widening partner university supervisor (South East Technological University):
Dr. Răzvan Calotă	Dr. Indrakshi Dey

The *E3-BioMod* project offers an exciting research opportunity at the forefront of sustainable construction, merging parametric design, agent-based modeling, and digital twin technologies. In line with the European Green Deal and New European Bauhaus initiatives, this thesis will develop bio-mimetic structural components that enhance energy and environmental efficiency. Candidates will work on creating a sophisticated digital twin platform, enabling real-time simulation and optimization of structures inspired by natural forms. Through interdisciplinary research combining computational modeling, experimental validation, and sustainability principles, the project aims to reduce material extraction, energy consumption, and carbon emissions significantly. Jointly supervised by Technical University of Civil Engineering Bucharest (UCTB) and South East Technological University (SETU), this PhD offers access to advanced research facilities, international collaboration, and the opportunity to contribute to the future of climate-resilient, sustainable urban development.

#### **Next Steps for Prospective Candidates**

PhD candidates are required to submit full applications, including a CV, motivation letter, ID, Master's diploma (or certificate of expected graduation), and the application form, between 1 – 31 May 2025. After this, the applications will be reviewed, and shortlisted candidates will be contacted and invited for interviews. The final selection of candidates will be completed by **20 July 2025**.

The [EU-CONEXUS Enables](#) initiative offers a great chance to contribute to impactful research and collaborate across borders. For more details on the application process, visit the official [EU-CONEXUS Enables PhD call page](#).

Best of luck to all applicants!