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AZTI Summer School 2025

Joint action from GES4SEAS, OBAMA-NEXT, BioBoost+, GuardiAS, ANERIS, POMP

**Artificial intelligence and
citizen science in
monitoring and assessing
biodiversity and invasive
species at sea**

Aquarium of San Sebastian
(Spain)

3 - 5 June 2025

Supported by:



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Introduction to the course

Since 2004, AZTI annually organizes an international ‘Summer School’ on marine research related cutting-edge topics, always trying to bridge the gap between research, policy and society. The course is taught by around 10 teachers and attended by around 40-60 students that join from 15-20 countries each year. Some years we have organized the school back-to-back with European projects, such as DEVOTES, MARS, SOPHIE, GlobalHAB, as well as other organizations (e.g. Euromarine, EEAcademy, European Environment Agency -EEA-, Frontiers in Marine Science).

In 2024, coinciding with the 20th edition of the school, the EU4Ocean Coalition Awards (European Commission) gave it the MakeEUBlue Award 2024, to the Best Professional Organisation initiative, due to its value on ocean literacy. It was awarded at the European Maritime Day (31st May 2024) in Svendborg (Denmark).

Despite being organized by AZTI, the last three editions have been organized in the framework of several Horizon Europe projects. The 2025 edition on “Artificial intelligence and citizen science in monitoring and assessing biodiversity and invasive species at sea” will be supported by the following projects: GES4SEAS, OBAMA-NEXT, GuardIAS, Bio-Boost+, ANERIS and POMP. All these projects started after 2022 and deal with the most recent research in marine biodiversity and environmental status, developing tools (including artificial intelligence and citizen science) which will help in monitoring and assessing the ocean health. However, the use of these tools, and the benefits they provide in assessing the status of marine biodiversity, need to be spread and communicated to end users and interested audience (e.g., scientists, managers, media, etc.).

Currently, different policies and directives, require monitoring and assessing the status of marine waters e.g. Water Framework Directive, Marine Strategy Framework Directive, Habitats and Birds Directives, Biodiversity Strategy, Nature Restoration Law, etc. in Europe. In some cases, invasive species are an important problem when investigating biodiversity, and in this context, artificial intelligence and citizen science can assist researchers in obtaining early warning sig-

nals to manage the problems that they can produce.

Hence, the main objective of the summer school is to present, both theoretically and practically, different tools and methods for monitoring and assessing biodiversity and alien species, using among others, artificial intelligence and citizen science. To achieve this objective, we have organized the school in three days, sharing the experiences from scientists participating in different projects. The course is open for early career scientists, senior scientists wanting to learn new things, managers and policy-makers, to jointly debate this current hot topic.

Contents of the course:

/ Tuesday, June 3rd

- **09:00 - 09:15 Introduction to the course**
Angel Borja, AZTI, Spain.
Coordinator GES4SEAS, participant in OBAMA-NEXT project
- **09:15 - 10:15 Boosting the Frequency and Scale of Marine Biodiversity Monitoring Using Digital Imagery and Artificial Intelligence**
Lisandro Benedetti-Cecchi, University of Pisa, Italy
BioBoost+
- **10:15 - 11:15 Robust validation and comparison of Artificial Intelligence methods**
Jose Fernandes, AZTI, Spain
OBAMA-NEXT, BioBoost+
- **11:15 - 11:45 Coffee break**
- **11:45 - 12:45 Species Identification through Artificial Intelligence and expert community – creating iNaturalist Projects**
Lauriane Ribas-Deulofeu, Nord University, Norway
BioBoost+ and GuardIAS
- **13:45-15:30 Lunch (not included)**
- **15:30-16:30 Benthic species workshop; elaboration of shared training-sets, labelling tool and supervised classification methods. Theory and practice**
Igor Granado, AZTI, Spain,
BioBoost+
Mihailo Azhar, Aarhus University, Denmark,
OBAMA-NEXT
- **16:30-17:00 Coffee break**
- **17:00-18:30 Benthic species workshop; elaboration of shared training-sets, labelling tool and supervised classification methods. Theory and practice**
Igor Granado, AZTI, Spain,
BioBoost+
Mihailo Azhar, Aarhus University, Denmark,
OBAMA-NEXT
- **19:00-20:30 Ice break with drinks and food**

/ Wednesday, June 4th

- **9:00-10:00 CIMPAL+ theory and practice for alien species assessment. Part 1**
Stelios Katsanevakis, University of the Aegean, Greece
GES4SEAS and GuardIAS
Heliana Teixeira, University of Aveiro, Portugal
GES4SEAS
- **10:00-11:00 CIMPAL+ theory and practice for alien species assessment. Part 2** Stelios Katsanevakis, University of the Aegean, Greece
GES4SEAS and GuardIAS
Heliana Teixeira, University of Aveiro, Portugal
GES4SEAS
- **11:00-11:30 Coffee Break**
- **11:30-12:30 Capacity building through citizen science initiatives: BioArtBlitz events, Zooniverse projects**
Agnese Marchini, University of Pavia, Italy
GuardIAS
- **12:30-13:30 Involving citizen science for large scale eDNA collection and establishing early-warning systems**
Rein Brys, INBO, Belgium
GuardIAS
- **13:30-15:15 Lunch break**
- **15:15-16:15 Data-validation solutions for citizen science data on invasive alien species using smartphones (JRC, EEA)**
Elena Tricarico, University of Florence, Italy
GuardIAS
- **16:15-16:45 Coffee break**
- **16:45-18:00 Data-validation solutions for citizen science data on invasive alien species using smartphones (JRC, EEA)**
Elena Tricarico, University of Florence, Italy
GuardIAS

Contents of the course:

/ Thursday, June 5th

- **9:00-11:00 Citizen science as a tool to reduce the marine biodiversity gap of knowledge and the usage of Artificial Intelligence. Practice in the Aquarium.**
Berta Companys, EMBIMOS Group, ICM-CSIC, Spain
ANERIS Project
- **11:00-11:30 Coffee Break**
- **11:30-12:30 Artificial Intelligence for communication in ocean sciences.**
Alice Estrela, Science Crunchers, Portugal, GES4SEAS, OBAMA-NEXT and POMP
- **12:30-13:30 Global discussion and way forward**
Led by Angel Borja and together with all professors

Supported by



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