EcoScope

SCAN ME

ecoscopium.eu

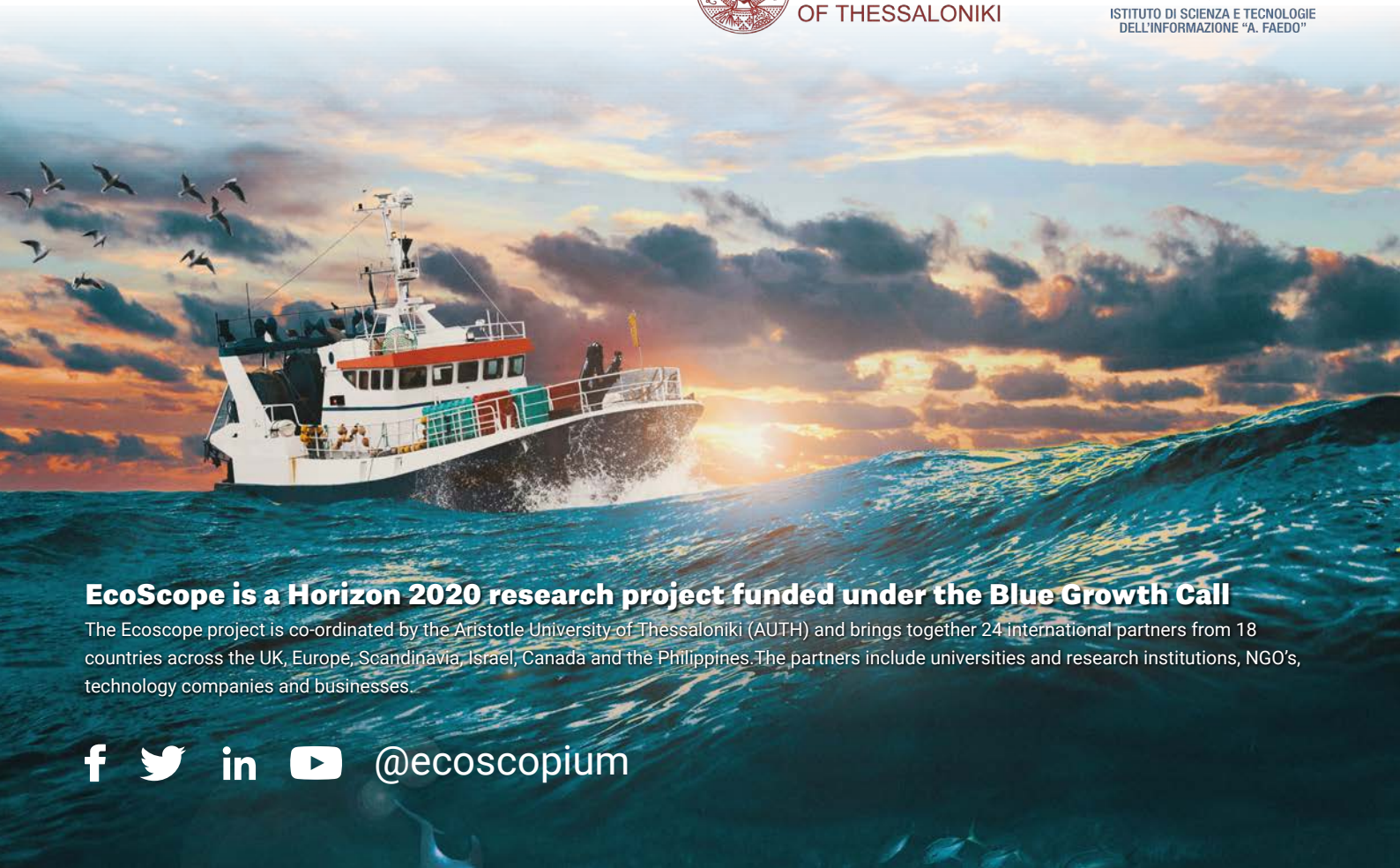
Big Marine Data Analytics and Models

16th to 18th May 2023

KEDEK AUTH, Balkan Center,
Building A, Room A 301
10th km Thessaloniki-Thermi, 57001
Aristotle University of Thessaloniki
Thessaloniki, Greece

ARISTOTLE UNIVERSITY OF THESSALONIKI

ISTITUTO DI SCIENZA E TECNOLOGIE DELL'INFORMAZIONE "A. FAEDO"



EcoScope is a Horizon 2020 research project funded under the Blue Growth Call

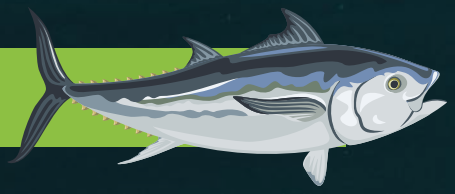
The Ecoscope project is co-ordinated by the Aristotle University of Thessaloniki (AUTH) and brings together 24 international partners from 18 countries across the UK, Europe, Scandinavia, Israel, Canada and the Philippines.The partners include universities and research institutions, NGO's, technology companies and businesses.

@ecoscopium

General Information

EcoScope, a four-year (2021-2025) research project (https://ecoscopium.eu) addresses ecosystem degradation and anthropogenic impact that cause fisheries to be unsustainably exploited in several European Seas and promotes efficient, holistic, sustainable, ecocentric fisheries management that will aid towards restoring fisheries sustainability and ensuring balance between food security and healthy seas. Within its Academy, EcoScope project offers a series of courses on marine and fisheries science to young researchers to promote cross community education and knowledge sharing. The first course is co-organised by the Aristotle University of Thessaloniki, Greece (AUTH) and the National Research Council of Italy (CNR).

Course Description



In this course, practical methodologies for marine data analysis and modelling will be presented.

The course will cover specific classes of problems in marine science and their corresponding solutions, adopting state-of-the-art computer science technologies and methodologies. The explained techniques will include:

- Research e-Infrastructures to support Artificial Intelligence models within the Open Science and Big Data contexts;
- Unsupervised approaches to discover patterns of habitat change and predict fishing vessel activity patterns: Feature selection methods, cluster analysis, and time series forecasting;
- Supervised approaches for species distribution prediction and invasive species monitoring: Artificial Neural Networks, Support Vector Machines, Maximum Entropy, AquaMaps;
- Bayesian models to predict fish stock availability.

These methods will be applied to marine data such as vessel transmitted data, species observation records, and catch and vessel time series that fall into the Big Data category. These data are crucial to safeguard food availability and economic welfare, which are fundamental to human life. For example, predicting the impact of climate change on species habitat distribution contributes to avoiding economic and biodiversity collapse due to sudden ecosystem change. Likewise, monitoring the effect of overfishing on fish stocks and marine biodiversity prevents ecosystem and economic collapse.

The explained techniques will address real use cases of the United Nations (FAO, UNESCO, UNEP, and others) for marine food and ecosystem safety and illustrate the new lines of research in this context. The methodologies will be illustrated in the context of the Open Science paradigm, which fosters the repeatability, reproducibility, and cross-domain reuse of all experimental phases.

The Course In Brief

- Marine data
- Species observation and environmental parameter selection techniques
- Distance and density-based cluster analysis for habitat and vessel pattern recognition
- Artificial Neural Networks for species distribution modelling
- Bayesian state-space models for population dynamics
- Open Science approaches
- Stock assessment

How To Apply

Registration and Fees

Registration and attendance of the course are free of charge. However, attendees are required to cover all their travel, accommodation, and local transportation costs and their other living expenses.

Certificate of Attendance

All participants will receive a certificate of attendance from CNR following a successful completion of a final exercise that will form the course exam.

Required knowledge and hardware/ software requirements

A general undergraduate-level statistical knowledge is required and a basic knowledge of ecology and fisheries biology. The course will be interactive and made up of practical exercises. Attendees will use online (the D4Science platform, https://services.d4science.org) and offline (QGIS, Java-based MaxEnt) software to parametrize the models and run the experiments.

Deadline for applications

Please send a short CV and a motivation letter (max 1 page) electronically to marefishlab@bio.auth.gr.

Deadline for applications:
31st of March 2023.

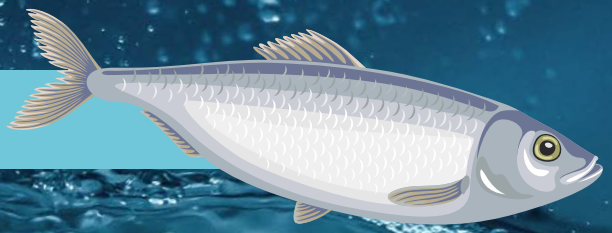
Instructor

Dr Gianpaolo Coro,

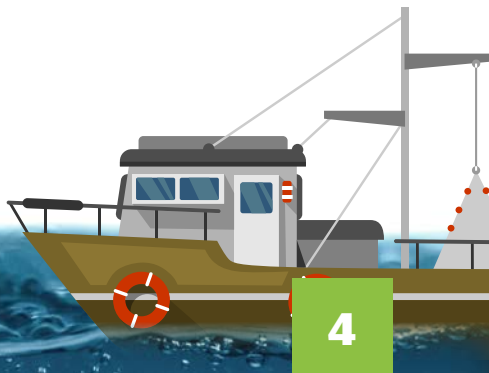
Istituto di Scienza e Tecnologie dell'Informazione "A. Faedo" (ISTI) - CNR- Italy

Gianpaolo Coro (gianpaolo.coro@cnr.it) is a Physicist with a PhD in Computer Science. His research regards Artificial Intelligence and Data Mining methodologies to process biological data. He has been working in this field for 20 years, focussing on applications in Ecology, Natural Language Processing, Medicine, and Cognitive Sciences. His research aims to study and experiment with models and methodologies to process biological data. His approach relies on distributed e-Infrastructures and uses parallel and distributed computing via Cloud-based technologies compliant with the Open Science paradigm.

Detailed Course Programme



Day / Time	Topic	Instructor
Tuesday 16 May		
09:00 – 11:00	Introduction to big data, Open Science	Gianpaolo Coro
11:00 – 11:15	Coffee break	
11:15 – 13:00	e-Infrastructures, geospatial data and biodiversity data	Gianpaolo Coro
13:00 – 14:00	Lunch break	
14:00 – 15:00	Cloud and parallel processing - Cloud storage for big data	Gianpaolo Coro
15:00 – 15:15	Coffee break	
15:15 – 16:30	Data space reduction methods	Gianpaolo Coro
Wednesday 17 May		
09:00 – 11:00	Ecological niche modelling through machine learning	Gianpaolo Coro
11:00 – 11:15	Coffee break	
11:15 – 13:00	Ecological niche modelling through machine learning	Gianpaolo Coro
13:00 – 14:00	Lunch break	
14:00 – 15:00	Alien and invasive species distribution modelling	Gianpaolo Coro
15:00 – 15:15	Coffee break	
15:15 – 16:30	Alien and invasive species distribution modelling	Gianpaolo Coro
Thursday 18 May		
09:00 – 11:00	Cluster analysis, time series forecasting methods	Gianpaolo Coro
11:00 – 11:15	Coffee break	
11:15 – 13:00	Data gap filling techniques, vessel data processing	Gianpaolo Coro
13:00 – 14:00	Lunch break	
14:00 – 15:00	Stock assessment	Gianpaolo Coro
15:00 – 15:15	Coffee break	
15:15 – 16:30	Stock assessment	Gianpaolo Coro



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