

# AI-TT workshop agenda overview

## 13th April - Day 1

09:15 Arrival and registration

09:40 Welcome, Gregory Smith and Rachel Furner

### Block 1 talks: Ocean Emulators

Chair: Rachel Furner (ECMWF), Rapporteur: Anass El Aouni (MOI)

09:50 Toward Scalable and Probabilistic Neural Ocean Forecasting, **Simon Van Gennip** (Mercator Ocean International)

10:10 Application of Deep learning (DL) in the Gulf of St. Lawrence and Estuary, **Francois Roy** (ECCC)

10:30 AI-driven Nanming Model for Three-dimension Ocean Variable Forecasting, **Xiaoyan Li** (Southern Marine Science and Engineering Guangdong Laboratory, Zhuhai)

10:50 Prediction of sea surface currents around the Korean peninsula using artificial neural networks, **Jae-Hun Park** (Department of Ocean Sciences, Inha University)

11:15 Coffee

11:45 **Discussion session 1: Expectations and requirements for AI in Ocean prediction, and how can the task team best support this**

Chair: Gregory Smith (ECCC), Rapporteur: Rachel Furner (ECMWF)

12:45 Lunch - self pay at local restaurants

### Posters

14:00 Poster flash talks: 2 mins from each author to introduce their poster.

14:15 Poster viewing and coffee

Chair: Anass El Aouni (MOI)

Filling the Ocean's Gaps: a Self-Supervised Neural Network for Argo Profiles Data Augmentation, **Teresa Tonelli**, (OGS, University of Trieste)

Assimilation of sea surface temperature in the Mediterranean Sea using ML-based operators, **Daniele Bigoni** (CMCC Foundation, Italy)

Detection and Discrimination of Marine Oil Spills and Look-alike Phenomena in Synthetic Aperture Radar Imagery, **Xudong Huang** (Department of Oceanography, Dalhousie University)

Machine Learning Forecast Correction for Geophysical Fields, **Jacopo Dall'Aglio** (University of Bologna)

Bridging Scales in Mediterranean Biogeochemical Prediction: A High-Order Ensemble Assimilation Coupled with AI-Driven Downscaling, **Simone Spada** (OGS)

Data-driven ocean modelling at ECMWF, **Rachel Furner** (ECMWF)

### Block 2 talks: Observations and Data Assimilation

Chair: Jae-Hun Park (Inha University), Rapporteur: tbc

15:15 Training end-to-end neural mapping schemes from simulation data for the reconstruction of global-scale sea surface fields, **Daniel Zhu** (IMT Atlantique)

15:35 Short-term neural forecasts of ocean dynamics from sparse satellite observations, **Daria Botvynko** (IMT Atlantique)

15:55 Two-Phase CNN for Model Data Fusion: Predicting 3D Chlorophyll-a in the Mediterranean Sea, **Teresa Tonelli** (OGS, University of Trieste)

16:15 A Deep-Learning Observation Operator for Subsurface Thermohaline Reconstruction from Satellite Surface Observations, **Geon Min Lee** (Pukyong National University, Republic of Korea)

16:35 AI perform on high resolution three-dimensional ocean forecasting: remote sensing data driven becomes a new possibility, **Liyang Wan** (National Marine Environmental Forecasting Center)

17:00 Optional pub trip

18:30 Optional (self-pay) dinner at **Trois Brasseurs on St. Denis**

### Block 3 talks: Emulators

Chair: **Charlie Hebert-Pinard** (ECCC), Rapporteur: **tbc**

- 09:00 Linear Stochastic Emulators of the Ocean Circulation - A Lesson, perhaps, for Machine Learning, **Andrew Moore** (*University of California Santa Cruz*)
- 09:20 A data driven limited area storm surge model, **Mateusz Matuszak** (*Norwegian Meteorological Institute*)
- 09:40 A Physics Informed Emulator for Ocean Oxygen, **Annalisa Bracco** (CMCC) (*remote*)
- 10:00 Application and Verification of the Global Wave Intelligent Forecast Model, **Fang Hou** (*National Marine Environmental Forecasting Center*)
- 10:20 Development of machine-learning emulators for harbour-scale ocean prediction, **Michael Dunphy** (*Institute of Ocean Sciences, Fisheries and Oceans Canada*)

10:45 Coffee

### Keynote

Chair: **Fraser Davidson** (ECCC), Rapporteur: **Kristian Mogensen** (ECMWF)

- 11:15 OceanBench: A Benchmark for Data-Driven Global Ocean Forecasting systems, **Anass El Aouni** (*Mercator Ocean International*)

12:15 Lunch - self pay at local restaurants

### Block 4 talks: Downscaling, and other ML applications

Chair: **Frederic Dupont** (ECCC), Rapporteur: **Simon Corbeil-Letourneau** (ECCC)

- 13:30 Intelligent forecasting of marine environmental elements in the South China Sea, **Xueming Zhu** (*Southern Marine Science and Engineering Guangdong Laboratory, Zhuhai*)
- 13:50 From Coarse Models to Coastal Detail: A Deep Learning Approach to AI based Statistical Downscaling in the Adriatic Sea, **Alessandro De Lorenzis** (CMCC Foundation - Euro-Mediterranean Center on Climate Change) (*remote*)
- 14:10 Integrated AI\_Physics Approaches for Coastal Prediction Across the Open-to-Coastal Ocean Continuum, **Joanna Staneva** (*Helmholtz Zentrum HEREON*)
- 14:30 Fix the double penalty in data-driven forecasting by modifying the loss function, **Christopher Subich** (*Environment & Climate Change Canada*)
- 14:50 Variational autoencoder-based clustering for geophysical fluid circulations with small sample size, **Kunihiro Aoki** (*Meteorological Research Institute, Japan Meteorological Agency*)

15:15 Coffee

### 15:50 Discussion session 2: Benchmarking, assessment and validation of ML models

Chair: **Rachel Furner** (ECMWF), Rapporteur: **Simon Van Gennip** (MOI)

16:50 Workshop wrap up

17:00 Close