

# Workshop Proposal

## Title

### **Advances on Artificial Intelligence for the Sea (AAIS)**

Held in conjunction with the International Joint Conference on Neural Network (IJCNN) <https://www.ijcnn.org>

## Scope

The Ocean make up over 70% of the earth's surface and it is the cradle of life on Earth, providing good and services essential for mankind. Today many global challenges are threatening marine environment and ecosystems, putting some of those good and services at risk. Global programs for environmental monitoring and sustainable exploitation of marine resources are based on extensive data collection and modelling made possible by technological advances. Furthermore, in recent years, we are seeing rapid advances in the fields of artificial intelligence, computational intelligence and machine learning. These technologies can enable tackling many of the complex challenges in marine and Earth system science, as well as contribute to sustainable ocean resource management.

The purpose of the workshop is to host recent research advances in the field of technology and applications of Computational Intelligence, Machine Learning, and Data Mining in the fields of marine science and engineering.

Potential topics include (but are not limited to):

- Theory and Methodologies
  - Applied and Computational Mathematics;
  - Computational Intelligence;
  - Data Mining;
  - Machine Learning;
  - Statistical Methods.
- Applications
  - Marine Biology and Genomics;
  - Marine ecology;

- Marine applications of federating learning;
- Management of living resources;
- Satellite Imaging and Remote sensing;
- Navigation and survey planning;
- Marine automation and robotics;
- Signal processing and Computer Vision for Marine Science;
- Computational intelligence at the edge and osmotic computing;
- Big data management, services and decision support tools;
- Lagrangian/Eulerian computational modelling;
- Operational weather and marine forecasts and predictions;
- Massive workflows for AI powered marine science.
- IoT for marine science.

The scientific program will include, besides some invited talks and tutorials, contributed papers that will be presented in plenary oral or poster sessions.

## Chairs

- **Angelo Ciaramella** - University of Naples Parthenope
- **Raffaele Montella** - University of Naples Parthenope
- **Patrizio Mariani** - Technical University of Denmark

## Short Biography

### Angelo Ciaramella

- **Affiliation:** Dipartimento di Scienze e Tecnologie, Università degli studi di Napoli “Parthenope”, Centro Direzionale, Isola C4, 80143 Napoli, Italy, e-mail: [angelo.ciaramella@uniparthenope.it](mailto:angelo.ciaramella@uniparthenope.it)
- **Websites:** <https://sites.google.com/view/ciss-angelociaramella/home>, [ciss-lab.uniparthenope.it](http://ciss-lab.uniparthenope.it)
- **Short Bio:**  
Angelo Ciaramella is Associate Professor, President of Course of Study in Computer Science, Director of the iOS Foundation Program, Director of the “Computational Intelligence and Smart Systems” laboratory at the University of Naples “Parthenope”, Department of Science and Technologies. The main research interests of Angelo Ciaramella are Computational Intelligence, Machine Learning, Data Mining, Intelligent Signal Processing, Computer Vision for biological, ecological, astrophysical, geological,

environmental, meteorological and marine data. He is associate editor of international journals (i.e., Information Sciences, Soft Computing, International Journal on Artificial Intelligence Tools) and he has been co-editor of books (Internet and Distributed Computing Systems (LNBI), Computational Intelligence Methods for Bioinformatics and Biostatistics (LNBI)) and guest editor of a Special Issues (e.g., Recent Machine Learning Applications to Internet of Things (IoT), Electronics). He has been co-general Chair (IDCS2019), technical chair (CIBB2018), organizer and chair of Special Sessions (i.e., CIBB2018, WIRN2018-2019, Fuzz-IEEE 2017, NAFIPS 2004), and he is in the Program Committee (CIBB2018-2019, Fuzz-IEEE 2017, GCIS, ICIC2005-2020, AI2IA 2020) of international conferences. He is a Senior Member of IEEE and member IEEE Computational Intelligence Society, IEEE Signal Processing, SIREN, CVPL (ex GIRPR), AIxIA.

## Raffaele Montella

- **Affiliation:** Dipartimento di Scienze e Tecnologie, Università degli studi di Napoli “Parthenope”, Centro Direzionale, Isola C4, 80143 Napoli, Italy, e-mail: raffaele.montella@uniparthenope.it
- **Websites:** <http://raffaelemontella.it>
- **Short Bio:** Raffaele Montella is an Assistant Professor with tenure (eligible as Associate Professor) in Computer Science at the Department of Science and Technologies, University of Naples “Parthenope”. His research focused on tools for HPC, Cloud Computing, and GPU, with AI applications to Computational Environmental (Marine) Sciences. He is a member of RDCEP of the University of Chicago as Visiting Scholar and as a Visiting Assistant Professor (FACE-IT project, computational workflows). He is a member of ReCEPL, Suor Orsola Benincasa University (AI, law, and information technology). He directs the IT infrastructure of the Center for Marine and Atmospheric Monitoring and Modeling (CMMMA) and the Research Computing Facilities (RCF). He was the technical manager of the local research unit of the H2020 project “Heterogeneous secure multi-level Remote Acceleration service for low-Power Integrated systems and Devices (RAPID)”, contributing with GVirtuS (General purpose gpu Virtualization and remoting Service) for the execution of the CUDA kernel on mobile and embedded devices. He was Principal Investigator of the project: “Modeling mytilus farming System with Enhanced web technologies (MytiluSE)”, funded by the Campania Region, for the prediction and evaluation (with AI techniques) of the quality of edible mussels. He is the Principal Investigator of the DYNAMO project. He is Principal Investigator of the local unit of the Erasmus+ “Framework for Gamified Programming Education” (FGPE) project. He is Principal Investigator of the CINI local unit of the Euro-HPC H2020 project “Adaptive multi-tier intelligent data manager for Exascale” (ADMIRE).

## Patrizio Mariani

- **Affiliation:** Institute for Aquatic Resources, Technical University of Denmark (DTU Aqua), Kemitorvet, 2800 Lyngby, Denmark, e-mail: pat@aqua.dtu.dk
- **Websites:** <https://www.dtu.dk/english/service/phonebook/person?id=39819>
- **Short Bio:** Patrizio Mariani is Senior Research scientist and Head of the Ocean Observation Technology group at the Technical University of Denmark (DTU). His research focuses on marine ecosystem dynamics including methods and technologies supporting the next generation integrated marine ecosystem assessment. He holds a PhD (2005) in Marine Science and Engineering from the University of Naples, Federico II, and a MSc (2000) in marine environmental science. He is vice president of EUROMARINE (European marine science network with 50 European Member Organizations), member of the European Marine Board (science policy interface), and Principal Investigator in several EU H2020 and EMFF projects. He was the coordinator of the national project SENTINEL (2016-2019) with focus on cognitive underwater robotics and applications (<http://sentinel.dtuaqua.dk/>). He is presently the coordinator of EU H2020 MISSION ATLANTIC (2020 - 2025, ca. 20M € budget) with focus on marine integrated ecosystem assessment, including development of autonomous technologies for ocean data acquisition, storage and processing (<http://missionatlantic.eu/>). He is course responsible at DTU Aqua for marine survey and ocean technology.

## Confirmed and/or potential speakers

### Confirmed Speakers

- Ian Foster (Department of Computer Science, University of Chicago and Argonne National Laboratory, U.S.);
- Paul G Fernandes (Chair in Fisheries Science School of Biological Sciences, Zoology Building, University of Aberdeen, UK);
- Roberto Galeazzi (Head of Center for Collaborative Autonomous Systems, Technical University of Denmark);
- Roland Proud (Pelagic Ecology Research Group Scottish Oceans Institute Gatty Marine Laboratory University of St Andrews);
- Giosuè lo Bosco (Dipartimento di Matematica e Informatica, Università degli Studi di Palermo, Italy);
- Sokol Kosta (University of Aalborg, Denmark);
- Salvatore Gaglione (DiST, Università degli Studi di Napoli Parthenope, Italy).

## Potential speakers

- Ketil Malde (Department of Informatics, University of Bergen);
- Cigdem Beyan (Istituto Italiano di tecnologia, Italy);
- Wolfgang Nikolaus Probst (Institute of Sea Fisheries, Germany);
- Ahmad Salman (James Madison University, U.S.);
- Ammar Mahmood (The University of Western Australia);
- Yi-Chin Lu (Department of Bio-Industrial Mechatronics Engineering, National Taiwan University);
- Amaya Alvarez-Ellacuri (IMEDEA (CSIC-UIB), Illes Balears, Spain);
- Geoff French (School of Computing Sciences, University of East Anglia, Norwich Research Park, Norwich);
- Rafael Garcia (Computer Vision and Robotics Institute, University of Girona, Spain);
- Chi-Hsuan Tseng (Department of Biomechatronics Engineering, National Taiwan University, Taipei, Taiwan);
- Nabil Semmar (Laboratory of Bioinformatics, Biomathematics and Biostatistics, LR 16 IPT 09, Pasteur Institute of Tunis, University of Tunis El Manar, Tunis, Tunisia);
- Shijie Zhou (The Commonwealth Scientific and Industrial Research Organisation, CSIRO - Oceans and Atmosphere);
- Xin Sun (Ocean University of China);
- Yingqi Li (North China University of Technology);
- Fan Wang (Institute of Oceanology, Chinese Academy of Sciences, Qingdao, China; Key Laboratory of Ocean Circulation and Waves);
- Zhigang Li (North China University of Technology);
- Chuanmin Hu (USF College of Marine Science, China);
- Paul Fernandez (University of Aberdeen, UK);
- Alessio Ferone (Università degli Studi di Napoli Federico II, Italy);
- Vincenzo Capozzi (DiST, Università degli Studi di Napoli Parthenope, Italy).

## **Half day (3 hours) or full day (6 hours)**

Full day (6 hours). Program draft: four sessions with 20' for 3 lectures, followed by 30 min round table.

## **Link to organizer's web page and/or workshop web site (optional)**

### **Angelo Ciaramella**

- **Personal:**
  - <https://sites.google.com/view/ciss-angelociaramella/home>
  - <https://www.uniparthenope.it/ugov/person/2666>
- **Laboratory:** [cisslab.uniparthenope.it](http://cisslab.uniparthenope.it)

### **Raffaele Montella**

- **Personal:**
  - <http://raffaelemontella.it>
  - <https://www.uniparthenope.it/ugov/person/1204>
- **Laboratory:** [hpsc.uniparthenope.it](http://hpsc.uniparthenope.it)

### **Patrizio Mariani**

- **Personal:**
  - <https://www.dtu.dk/english/service/phonebook/person?id=39819>
- **Laboratory:**
  - <http://sentinel.dtuaqua.dk/>
  - <http://missionatlantic.eu/>

### **Neptun-IA Lab**

- **Laboratory:** <https://neptunia.uniparthenope.it>