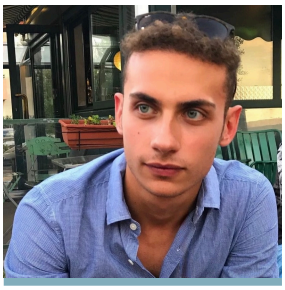
CV - MARCO MARIANO DE CARLO



LinkedIn: https://www.linkedin.com/in/marco-de-carlo-7a1544175/

LANGUAGE SKILLS

- Mother tongue: Italian
- Other language: English

MAIN PROGRAMMING LANGUAGES

- Python
- Java
- SQL
- Bash
- Javascript
- Typescript
- HTML
- CSS
- C

MAIN LIBRARIES, TOOLS AND DATA FORMAT

- Machine Learning & Data Science: Pandas, Numpy, Scikit-Learn, Scipy, Matplotlib, Seaborn, Xarray, Shapely, PyTorch, PyTorch Geometric, Tensorflow, Keras, NetworkX, GeoPandas, Cartopy, Basemap, OpenCV
- Parallel Computing: MPI, OpenMP
- Development Tools: Git, Docker
- Geospatial Software: QGIS
- OS: UNIX, Microsoft
- Packaging Management & Environment: Anaconda, Mamba
- Web Development: Django, Spring, Angular, Ionic

Post Degree Researcher at Euro-Mediterranean Center on Climate Change (CMCC) in the field of Data Science for Climate Change with a strong inclination towards Machine Learning and autonomous learning techniques.

PROFESSIONAL EXPERIENCE

- Post Degree Researcher, CMCC Foundation (Euro-Mediterranean Center on Climate Change) - Advanced Digital Innovation Center (ADIC) - Machine Learning (ML) Research Line, January 2025 - Actually
- Post Degree Researcher, CMCC Foundation (Euro-Mediterranean Center on Climate Change) - Advanced Scientific Computing (ASC) Division - Machine Learning (ML) Research Line, November 2023 - December 2024
- Research Intern, CMCC Foundation (Euro-Mediterranean Center on Climate Change) - Advanced Scientific Computing (ASC) Division - Machine Learning (ML) Research Line, March 2023 - May 2023

EDUCATION

- "Data-Driven Modeling and Prediction of the Earth System" Winter School - Future Earth Research School (FERS), Bertinoro (FC), 9th - 20th December 2024
- M.Sc. in Computer Engineering - Università del Salento, Lecce, 2020 - 2023
- B.Sc. in Information Engineering - Università del Salento, Lecce, 2015 - 2019

SKILLS

- Theory and practice of Machine Learning and Artificial Intelligence applied particularly to Climate Science
- Application of Computer Vision techniques for image generation, reconstruction, and pattern inference leveraging advanced Machine Learning and Deep Learning techniques
- Database (DB) theories, techniques and tools to design / implement DB and DB applications
- Improvement of Numerical Models through Machine Learning (e.g. enhancing physical parametrization)
- Ability to use advanced optimization techniques to solve complex problems and improve scientific simulations
- Experience in applying estimation algorithms to improve the accuracy of scientific predictions and simulations
- Experience in using supercomputing systems to perform computations and analysis of large datasets
- Use of HPC clusters for scientific simulations and modeling
- Knowledge of IoT theory and practice for the main technologies used for the development of the main use cases concerning the field
- Software Architecture design and implementation
- Software Engineering and full stack development
- System application programming on a UNIX system
- Design, analysis and implementation of sequential and parallel algorithms
- Principles of operation of a modern computer network and how they could be addressed in order to ensure appropriate delivery of the application services

HOBBIES AND INTERESTS

- Karate agonist athlete with Athlon Lecce Team
- Technical karate teacher/ Aspiring karate coach
- Former Karate agonist athlete with CUS Lecce

PROJECTS

- iMagine - EU-funded project. The project provides a portfolio of image datasets, high performance image analysis tools empowered with Artificial Intelligence, and Best Practice documents for scientific image analysis, including AI-assisted image generation. Specifically, my research in this project focuses on oil spill event simulation improvement through Machine Learning tools.
- ARCA - EU-funded project on drought monitoring and prediction, windstorm risk mitigation, and fire hazard index prediction by integrating climate data with advanced Machine Learning and Artificial Intelligence models to improve natural hazard management.
- SWITCH - EU-funded project exploring innovative strategies and technologies to facilitate the transition to healthy and sustainable diets among European citizens. My main contribution involves applying Machine Learning algorithms to data collected and managed within a Data Lake we implemented.
- interTwin - EU-funded project. The project aims at designing and building a prototype of an interdisciplinary Digital Twin Engine (DTE), based on a co-designed Blueprint Architecture. My contribution specifically involves developing methods for the detection and tracking of tropical cyclones, leveraging Machine Learning and Artificial Intelligence techniques.
- A Bayesian Optimization workflow-based hybrid model for integrating Machine Learning techniques into Numerical Models (e.g. MEDSLIK-II) for climate prediction.
- Simple application of Computer Vision for Armocromia techniques with the help of OpenCV and Convolutional Neural Network.
- Estimation of the relative position of a group of mobile robots based on relative distance information in 3D 'marine' environment.
- Prototype of a database feeding software to support Machine Learning for predictive maintenance in aeronautics.
- Parallel algorithm for determining the connected components of an undirected graph in C and MPI.
- Traceability of products and their status through IoT devices in a cloud environment (Oracle Cloud, AWS, Microsoft Azure and ThingsBoard).

PAPERS AND CONFERENCES

- Accarino, G., **De Carlo, M. M.**, Atake, I., Elia, D., Dissanayake, A. L., Sepp Neves, A. A., Peña Ibañez, J., Epicoco, I., Nassisi, P., Fiore, S., & Coppini, G. (2025). Improving Oil Slick Trajectory Simulations with Bayesian Optimization. arXiv. https://doi.org/10.48550/arXiv.2503.02749.
- **De Carlo, M. M.**, Accarino, G., Atake, I., Elia, D., Epicoco, I., and Coppini, G.: Improving Oil Spill Numerical Simulations through Bayesian Optimization, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025
- Gow-Smith, E., Benincasa, R., **De Carlo, M. M.**, Ivanov, E., Norberti, S., and Chapman, W.: Simplifying Earth System Projections: Mimicking ESM Results with a Diffusion Model, EGU General Assembly 2025, Vienna, Austria, 27 Apr–2 May 2025
- **De Carlo, M. M.**, Accarino, G., Atake, I., Elia, D., Coppini, G., and Aloisio, G.: Bayesian Optimization applied to Oil Spill Detection, EGI Conference 2024, Lecce, Italy, 30 Sep–4 Oct 2024
- Atake, I., Accarino, G., **De Carlo, M.**, Elia, D., Coppini, G., and Aloisio, G.: Optimizing Medslik-II: Parametrization through a bayesian search algorithm applied at the Baniyas oil spill incident (Syria, 2021), EGU General Assembly 2024, Vienna, Austria, 14–19 Apr 2024, EGU24-7256, https://doi.org/10.5194/egusphere-egu24-7256, 2024.

RECENT AWARDS

- 1st place in UniSalento Data Hackaton 2021/2022 with my Team

SOFT SKILLS

- Excellent listening skills towards colleagues and people with whom you interact, taking into account ideas and opinions of the team and reliability in working relationships
- Excellent Team Working skills and emotional intelligence, enhancing collaboration and respect for all team members with particular attention to stressful situations learned in the university and sports fields
- Excellent organization skills in the autonomous management of activities but also during collaboration with the team, in particular good management of activities with respect to deadlines and achievement of set objectives
- Ability to work and perform under pressure and in times of high stress, enhanced by the experiences received during university but also in a sports environment during martial arts lessons and competitions