FRANCESCO IMMORLANO, Ph.D.

University of California, Irvine

&

Learning the Earth with Artificial Intelligence and Physics (LEAP) STC

Phone: +39 328 5647301

e-mail: francesco.immorlano@gmail.com

FIELDS OF SPECIALIZATION

- Machine Learning, Generative Modeling, Climate Science, Computer Science

PROFESSIONAL RECORD

Sep 2024–present **Postdoctoral Researcher**
Department of Computer Science, University of California Irvine & Learning the Earth with Artificial Intelligence and Physics (LEAP) STC
Supervisors: Prof. Stephan Mandt, Prof. Pierre Gentine

May 2024–Aug 2024 **Postdoctoral Researcher**
Advanced Scientific Computing Division, Euro-Mediterranean Center on Climate Change (CMCC) Foundation, Lecce, Italy

Mar 2022–Apr 2022 **Visiting Research Scientist**
Department of Earth and Environmental Engineering, Columbia University & Learning the Earth with Artificial Intelligence and Physics (LEAP) STC
Supervisor: Prof. Pierre Gentine

May 2020–Oct 2020 **Postgraduate Researcher**
Advanced Scientific Computing Division, Euro-Mediterranean Center on Climate Change (CMCC) Foundation, Lecce, Italy

EDUCATION

Dec 2020–May 2024 **Ph.D., Engineering of Complex Systems**
Department of Innovation Engineering, University of Salento, Lecce, Italy
Supervisor: Prof. Giovanni Aloisio

Dec 2017–Apr 2020 **M.Sc., Computer Engineering**
Department of Innovation Engineering, University of Salento, Lecce, Italy
Supervisor: Prof. Giovanni Aloisio

Sep 2014–Oct 2017 **B.Sc., Information Technology Engineering**
Department of Innovation Engineering, University of Salento, Lecce, Italy
Supervisor: Prof. Giovanni Aloisio

EUROPEAN & INTERNATIONAL PROJECTS

Sep 2022–Aug 2025 **interTwin** — Grant agreement ID: 101058386
Contributor in WP3, WP5
doi: https://cordis.europa.eu/project/id/101058386

Sep 2022–Aug 2025 **iMagine** — Grant agreement ID: 101058625
Contributor in WP4, WP6, WP7
doi: https://cordis.europa.eu/project/id/101058625

Jan 2019–Mar 2023 **ESiWACE2** — Grant agreement ID: 823988
Contributor in Task 2.4
doi: https://cordis.europa.eu/project/id/823988

RESEARCH EXPERIENCE

- Francesco Immorlano's research interests are focused on Machine Learning and Deep Learning algorithms with a specific application to the Climate Change domain. He is currently investigating the design and development of diffusion models and other generative models in several use cases related to Climate Science.

PUBLICATIONS: PEER-REVIEWED JOURNAL ARTICLES

In press/published

- **Immorlano, F.**, Eyring, V., le Monnier de Gouville, T., Accarino, G., Elia, D., Aloisio, G., & Gentine, P. Transferring climate change physical knowledge. *Proc. Natl. Acad. Sci. U.S.A.* 122 (15), e2413503122. 10.1073/pnas.2413503122 (2025).
- Accarino, G., Donno, D., **Immorlano, F.**, Elia, D., & Aloisio, G. An ensemble machine learning approach for tropical cyclone localization and tracking from ERA5 reanalysis data. *Earth and Space Science*, 10(11), e2023EA003106. 10.1029/2023EA003106 (2023).
- Gatto, A., Aloisi, V., Accarino, G., **Immorlano, F.** Chiarelli, M., & Aloisio, G. An Artificial Neural Network-based approach for predicting the COVID-19 daily effective reproduction number R_t in Italy, *MDPI AI*, 3(1), p. 146–163. 10.3390/ai3010009 (2022).
- Gatto, A., Accarino, G., Aloisi, V., **Immorlano, F.**, Donato, F. & Aloisio, G., Limits of Compartmental Models and New Opportunities for Machine Learning: A Case Study to Forecast the Second Wave of COVID-19 Hospitalizations in Lombardy, Italy, *MDPI Informatics*, 8(3), p. 57. 10.3390/informatics8030057 (2021).
- Accarino, G., Chiarelli, M., **Immorlano, F.**, Aloisi, V., Gatto, A., & Aloisio, G. MSG-GAN-SD: A Multi-Scale Gradients GAN for statistical downscaling of 2-meter temperature over the EURO-CORDEX domain, *MDPI AI*, 2(4), pp. 600–620. 10.3390/ai2040036 (2021).

WORKSHOPS & CONFERENCES

- **Immorlano, F.** (2025) Deterministic vs. Probabilistic Projections of Climate Change (Oral presentation, Invited). GRC Conference – Machine Learning for Actionable Climate Science, 22–27 June 2025, Bryant University, Smithfield, RI.

- **Immorlano, F.**, Eyring, V., le Monnier de Gouville, T., Accarino, G., Elia, D., Mandt, S., Aloisio, G., & Gentine, P. (2025). Transferring climate change physical knowledge (Poster). EXCLAIM Symposium, 2–4 June 2025, ETH Zurich, Switzerland.
- **Immorlano, F.**, Eyring, V., le Monnier de Gouville, T., Accarino, G., Elia, D., Mandt, S., Aloisio, G., & Gentine, P. (2025). Transferring climate change physical knowledge (Oral presentation). Climate Informatics 2025, 28–30 April 2025, Rio de Janeiro, Brazil.
- **Immorlano, F.**, Eyring, V., le Monnier de Gouville, T., Accarino, G., Elia, D., Aloisio, G., & Gentine, P. (2024). Transferring climate change knowledge (Poster). Climate Informatics 2024, 22–24 April 2024, London, UK.
- D'Anca, A., Scardigno, S., Ejarque, J., Accarino, G., Peano, D., **Immorlano, F.**, ... & Aloisio, G. (2024). An end-to-end workflow for climate data management and analysis integrating HPC, Big Data and Machine Learning (No. EGU24-11774). EGU General Assembly 2024, 14–19 April 2024, Vienna, Austria.
- **Immorlano, F.**, Eyring, V., le Monnier de Gouville, T., Accarino, G., Elia, D., Aloisio, G., & Gentine, P. (2023). Transferring climate change knowledge (Poster No. A11I-2118). AGU 2023, 11–15 December 2022, San Francisco, CA.
- Accarino, G., Elia, D., Donno, D., **Immorlano, F.**, & Aloisio, G. (2023). A machine learning-powered Digital Twin for extreme weather events analysis (Poster, No. EGU23-6060). EGU General Assembly 2023, 23–28 April 2023, Vienna, Austria.
- Elia, D., Scardigno, S., D'Anca, A., Accarino, G., Ejarque, J., **Immorlano, F.**, ..., & Aloisio, G. (2023). Convergence of HPC, Big Data and Machine Learning for Earth System workflows (Poster No. EGU23-6857). EGU General Assembly 2023, 23–28 April 2023, Vienna, Austria.
- Elia, D., Scardigno, S., Ejarque, J., D'Anca, A., Accarino, G., Scoccimarro, E., Donno, D., Peano, D., **Immorlano, F.**, & Aloisio, G. (2023, November). End-to-End Workflows for Climate Science: Integrating HPC Simulations, Big Data Processing, and Machine Learning. In Proceedings of the SC'23 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (pp. 2042-2052).
- **Immorlano, F.**, Chiarelli, M., Accarino, G., Aloisio, G., & Gentine, P. (2022). Generating Accurate Climate Model Realizations (Oral Presentation No. A55D-08). AGU 2022, 12–16 December 2022, Chicago, IL.