Rachid El Montassir, Ph.D.

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https://relmonta.github.io

Employment History

2025 – 27 **Postdoctoral researcher.** CERFACS, Toulouse, France.
Working on climate downscaling using deep learning foundation models. The project is expected to end on january 2027.

2021 – 24 **Ph.D. Student.** CERFACS, Toulouse, France.
Thesis title: *Hybrid Physics-AI architecture for cloud cover nowcasting.* This study introduces a hybrid approach combining Physics and AI for cloud cover nowcasting, aiming to address limitations of traditional deep learning methods. This method, called HyPhAICC, enforces physical constraints in a differentiable way within a classical neural network model, showing superior performance compared to conventional methods and achieving better detail preservation with less data. This work led to a publication in Geoscientific Model Development (GMD) journal and a poster presentation at the ECMWF Machine Learning Workshop 2022 [1].

2022 – 24 **Part-time lecturer.** ENSEEIHT, Toulouse, France.
Teaching: - *Introduction to Deep Learning.*

Part-time lecturer. École Nationale de Météorologie, Toulouse, France.
Teaching: - *Probabilities and Statistics,* - *Machine Learning and Deep Learning.*

2021 **Research Intern.** CERFACS, Toulouse, France.
Research project: *Designing a hybrid AI-Physics model for cloud cover nowcasting.*

Education

2021 – 24 **Ph.D., Paul Sabatier University**. Deep Learning for Weather forecasting.
Thesis title: *Hybrid physics-AI based approach for probability fields advection. Application to cloud cover nowcasting.*

2020 – 21 **Master's degree, Toulouse INP**. Perf. in Software, Media & Scientific Computing (PSMSC).
Key subjects: *Deep Learning, Distributed and Cloud Computing.*

2018 – 21 **Engineering degree, ENSEEIHT**. Computer Science and Telecommunications.
Key subjects: *Programming, Optimisation, Data assimilation, Statistics and Machine Learning.*

2016 – 18 **Classes Préparatoires aux Grandes Écoles, Ibn Ghazi**. Mathematics & Physics (MPSI).

Research Interests

- Deep Learning-based climate modelling and weather forecasting. Hybrid Physics-AI approaches.

Publications

Journal Article

1 R. El Montassir, O. Pannekoucke, and C. Lapeyre, « HyPhAICC v1.0: A hybrid physics–AI approach for probability fields advection shown through an application to cloud cover nowcasting », English, *Geoscientific Model Development*, vol. 17, no. 17, pp. 6657–6681, Sep. 2024, Publisher: Copernicus GmbH, ISSN: 1991-959X. DOI: 10.5194/gmd-17-6657-2024. (visited on 09/10/2024).

Skills

Languages Strong reading, writing and speaking competencies for French and English. Mother tongues: Berber, Arabic.

Coding PyTorch, TensforFlow/Keras, Python, Java, R and Julia.

1. https://events.ecmwf.int/event/294/page/155-posters