

Rachid El Montassir, futur Ph.D.

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🐙 relmonta

🌐 rachid-elmontassir

🌐 <https://relmonta.github.io>



Employment History

- 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 HyPhAI, 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 submission to Geoscientific Model Development (GMD) journal and a poster presentation at the ECMWF Machine Learning Workshop 2022¹. Defense expected in Oct. 2024.
- 2022 – 24 📖 **Lecturer.** ENSEEIHT, Toulouse, France.
Teaching: - *Introduction to Deep Learning*.
- 📖 **Lecturer.** École Nationale de Météorologie, Toulouse, France.
Teaching: - *Probabilities and Statistics*, - *Machine Learning and Deep Learning*.
- 03 – 09/21 📖 **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 and Climate Science.
Thesis title: *Hybrid Physics-AI architecture for cloud cover nowcasting*.
- 2020 – 21 📖 **Master's degree, ENSEEIHT.** Perf. in Software, Media & Scientific Computing.
Key subjects: *Deep Learning, Distributed and Cloud Computing*.
- 2018 – 21 📖 **Engineering degree, ENSEEIHT.** Computer Science and Applied Mathematics.
Key subjects: *Optimization, Data assimilation, Statistics and Machine Learning (R + Python)*.
- 2016 – 18 📖 **Classes Préparatoires aux Grandes Écoles, Ibn Ghazi.** Mathematics & Physics.

Research Interests

- 📖 Applying Deep Learning to Climate and Weather Forecasting to improve the accuracy of predictions and reduce the computational cost.
- 📖 Incorporating physical knowledge into AI models for cheaper and less data-hungry models and better generalisation.

Research Publications

Journal Article (under review)

- 1 R. El Montassir, O. Pannekoucke, and C. Lapeyre, "Hyphai v1.0: Hybrid physics-ai architecture for cloud cover nowcasting," *EGUsphere*, vol. 2024, pp. 1–38, 2024. 🌐 DOI: 10.5194/egusphere-2023-3078.

Skills

- Languages 📖 Strong reading, writing and speaking competencies for French and English. Mother tongues: Berber, Arabic. Basic knowledge of Spanish and German.
- Coding 📖 PyTorch, TensorFlow/Keras, Python, Java, R and Julia.

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