

Ammar Kheder

Doctoral Researcher in Computational Engineering, LUT University, AMC-Lahti

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PROFILE

Doctoral researcher in computational engineering at LUT University, working on neural architectures that explicitly encode atmospheric physics for air quality and Earth system prediction. Hands-on experience with large-scale distributed training on the LUMI supercomputer (up to 1,024 AMD MI250X GPUs). Lead author of TopoFlow (npj Climate and Atmospheric Science, 2026). Founder and CEO of Wabel Group, an AI and web development company.

EDUCATION

- 2024 - now** **Ph.D., Computational Engineering**
LUT University, Lahti, Finland
Atmospheric Modelling Centre (AMC-Lahti). Supervisors: Prof. Michael Boy, Assoc. Prof. Zhi-Song Liu.
- 2021 - 2024** **M.Sc., Engineering (Big Data and Artificial Intelligence)**
EiCnam Paris, France
Apprenticeship at INRIA Bordeaux (Mnemosyne team).
- 2019 - 2021** **B.Sc., Data Science (BUT STID)**
BUT Niort, Universite de Poitiers, France
Statistics, big data, business intelligence, data science.

EXPERIENCE

- 2024 - now** **Junior Researcher and Teaching Assistant**
LUT University, Computational Engineering
Research on physics-informed deep learning for atmospheric science. Teaching assistant for Foundations of AI and Machine Learning (twice) and Foundations of Computer Science. Contributor to the AMC-Lahti summer school (25 participants, 2025).
- 2023 - 2026** **CEO and Founder, Wabel Group**
AI services and web development
Built cDESP, a B2B SaaS compliance platform for industrial refrigeration pressure equipment, in production for DCRR.
- 2021 - 2022** **Research Engineer (Apprenticeship)**
INRIA Bordeaux, Mnemosyne team
Worked on LingoRob, a crowdsourcing platform for multi-language linguistic corpora used to train Reservoir Computing models for human-robot interaction. Supervisor: Xavier Hinaut.
- 2021 - 2023** **Volunteer Firefighter**
Sapeurs-Pompiers des Deux-Sevres (SDIS 79), France
2 years 8 months of on-call service. Certifications: FISPV, PSC 1, PSE 1, PSE 2, SAP, INC 1, DIV.

PUBLICATIONS

TopoFlow: topography-aware pollutant Flow learning for high-resolution air quality prediction.

A. Kheder, H. Toropainen, W. Peng, S. Antao, J. Chen, M. Boy, Z.-S. Liu.

npj Climate and Atmospheric Science (Nature Portfolio), 2026. DOI: 10.1038/s41612-026-01417-5

CRAN-PM: Cross-Resolution Attention Network for High-Resolution PM2.5 Prediction.

A. Kheder et al.

Preprint, 2026 (under review). arXiv:2603.11725

Inverse Neural Operator for ODE Parameter Optimization.

Z.-S. Liu, W. Peng, H. Toropainen, A. Kheder, A. Rupp, H. Froning, X. Lin, M. Boy.

Preprint, 2026. arXiv:2603.11854

Deep Spatio-Temporal Neural Network for Air Quality Reanalysis.

A. Kheder, B. Foreback, L. Wang, Z.-S. Liu, M. Boy.

Scandinavian Conference on Image Analysis (SCIA 2025), Springer LNCS. DOI: 10.1007/978-3-031-95911-0_6

TALKS AND PRESENTATIONS

- Accepted talk at IAC 2026 (International Aerosol Conference), Xi'an, China.
- EAC 2025 (European Aerosol Conference), Lecce, Italy. AQ-Net poster.
- SCIA 2025, Reykjavik, Iceland. Speed talk and poster, Springer LNCS publication.
- LUT Doctoral School Science Conference 2025 (20 May), Lappeenranta.
- Invited visit to BUT SD Niort (5 January 2026): academic and professional journey.

SELECTED PROJECTS

- cDESP, a B2B SaaS compliance platform for industrial refrigeration pressure equipment. Built by Wabel Group for DCRR. esp.dcorr.fr
- Pokemon Robot Auction (22 Dec 2023, Paris). The world's first Pokemon card auction co-hosted by a NAO humanoid robot. 1,693 viewers. Endorsed by the French Presidency.
- LingoRob (INRIA Bordeaux, 2021-2022). Crowdsourcing platform for multi-language linguistic corpora to train brain-inspired language models for human-robot interaction.

TEACHING

- BM40A1601 Foundations of AI and Machine Learning, Fall 2024 and Fall 2025 (LUT, blended, Lpr/Lahti).
- BM40A0202 Foundations of Computer Science, Spring 2026 (LUT, blended, Lpr).
- AMC-Lahti summer school, Application of AI / ML techniques in Atmospheric Science (11-15 August 2025, 25 participants).

ACADEMIC VISITS

- May 2026 (5-6 May): two-day research stay with AMC member Prof. Jia Chen and her group at the Technical University of Munich (TUM). Start of a new international collaboration.
- July 2025: Istanbul Technical University. Air quality modelling with Dr Metin Baykara.
- April 2025: INRIA Bordeaux (N. Rougier and F. Alexandre) and Ecole Polytechnique Paris (V. Kalogeiton and M.-P. Cani).
- October 2025: LUMI training, Tallinn. Supercomputing, GPU profiling, performance optimisation.

TECHNICAL SKILLS

- Programming: Python (PyTorch, NumPy, scientific stack), C, SQL, JavaScript, HTML / CSS, VBA.
- HPC: distributed training on LUMI (up to 1,024 AMD MI250X GPUs), DDP, ROCm / CUDA, Slurm, Zarr.
- Deep learning: vision transformers, recurrent and graph neural networks, physics-informed and Reservoir Computing models.
- Web and product: Django, Flask, full-stack web, B2B SaaS delivery.

LANGUAGES

- French: native.
- Arabic: native.
- English: fluent (working language at LUT and in research).