

Amirpasha Mozaffari

Earth and Machine Learning Researcher

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Email: amirpasha.mozaffari@bsc.es **Address:** Barcelona, ES

Website: amirpasha.me **BlueSky:** [@amirpasha.bsky.social](https://bsky.app/profile/amirpasha.bsky.social) **Linkedin:** [@amirpasha-mozaffari](https://www.linkedin.com/in/amirpasha-mozaffari)

Research Interests Geosciences, Machine Learning (ML), HPC, Workflows, FAIR and ethical AI

Research Experience

Machine Learning Researcher Barcelona, Spain
Barcelona Supercomputing Center 01.2025 – Present
ML lead in the CONCERTO, TerraDT, and ELLIOT EU projects, focused on improving the water and carbon cycles in weather and climate models with ML
Co-PI of CONCERTO and PI of multiple EuroHPC compute projects

Visiting Researcher Jena, Germany
Max Planck Institute for Biogeochemistry 04.2026
Contributed to tuning and optimization of the TRENDY land-surface ML emulator and carried out experiments.

Research Engineer Barcelona, Spain
Barcelona Supercomputing Center 05.2023 – 12.2024
Developed and ported features for the next generation of the European Community Earth System Model (EC-Earth).
Explored applications of ML in climate modelling and enhancement of HPC system performance.

Team Leader Jülich, Germany
Jülich Supercomputing Centre 05.2022 – 05.2023
ML workflows for air quality and weather forecasting / FAIR and reproducible ML / application of FAIR Digital Objects in HPC and cloud computing.

Data Manager Jülich, Germany
Jülich Supercomputing Centre 05.2019 – 05.2022
Data management for multiple national and international research projects / workflow development for HPC systems / coordination of multiple computing projects / website development and maintenance.

Research Assistant Jülich, Germany
IBG-3: Agrosphäre 02.2015 – 05.2019

Numerical and statistical analysis of complex environmental data / development and optimization of HPC numerical modelling algorithms.

Education

RWTH Aachen University Aachen, Germany

Dr. rer. nat. (PhD) in Computational Geophysics 02.2015 – 01.2022

Thesis: Towards 3D crosshole GPR full-waveform inversion

Mentors: Prof. Dr. Klaus Reicherter & Prof. Dr. Harry Vereecken

Stuttgart University Stuttgart, Germany

M.Sc. in Water Resources Eng. & Man. 09.2011 – 12.2014

Mentor: Prof. Johan Alexander Huisman

Amirkabir University Tehran, Iran

B.Sc. Eng. in Mining Engineering 09.2007 – 06.2011

Mentor: Prof. Morteza Osanloo

Skills

Computer Science

Programming: Python (PyTorch, TF, Xarray, Scikit, Dask, mpi4py, ...), Shell, Matlab, C, HTML, git, Containers (Docker, Singularity)

Distributed Sys.: MPI, OpenMP, multithreading

Languages

Farsi/Persian (fluent), English (advanced), German (intermediate), Catalan (basic), Spanish (basic)

Fellowships / Grants

Severo Ochoa Mobility Grant 2026

ELSA Mobility Grant 2025

Juan de la Cierva Fellow 2024

NFDI4Earth Fellow 2023

Community

Regular reviewer for Copernicus (GMD, ESSD), Data Intelligence, and Software: Practice and Experience

Expert reviewer for the European Commission – Horizon Europe call

Reviewer of EuroHPC and PRACE compute project proposals

Member of the Research Data Alliance (RDA)

Member of the European Geosciences Union (EGU)

Former Co-Chair of the FAIR Digital Object Forum (FAIRDO)

Invited Talks & Presentations/ Posters

AI for weather and climate: WCPR-Pan-RIFS, Nanjing (2026); NeurIPS workshop, San Francisco (2025); DLBCN25, Barcelona (2025); AI for Carbon, Como (2025); ECMWF Symposium (2025); ELLIS, Jena (2025); EGU General Assembly, Vienna (2020, 2023, 2025, 2026)

FAIR data & workflows: International FDO Conference, Leiden (2022); International Data Week, Seoul (2022); FDO Forum (2021); RDA Virtual Plenary 15 (2020)

ML & HPC infrastructure: ESM Forum, Jülich (2020); NIC Symposium, Jülich (2020) , EGU General Assembly (2024)

GPR full-waveform inversion: AGU Fall Meeting, San Francisco (2016); 16th IGPRC, Hong Kong (2016); Near-surface FWI Workshop, Zürich (2016); GPR Round Table, Aachen (2015, 2017) ; EGU General Assembly (2016)

Selected Publications

A Checklist to assess the energy and carbon impacts of ML/AI applications in Earth System Modeling

F. Dainelli, **A. Mozaffari**, M. Castaño, A. Gaya i Àvila, Ll. Palma Garcia, A. Melli, O. Dimdore-Miles, A. Duarte

ECML PKDD 2026 Workshop on Green AI (accepted)

Scalable Deep Learning Framework for Global High-Resolution Land Use Reconstruction

A. Mozaffari, M. Castaño, S. Materia, E. Tourigny, O. Molina-Sedano, J. Varela-Agrelo, D. Garcia-Gasulla, M. Castrillo Melguizo, M. Acosta, A. Duarte

Procedia Computer Science, 2026

The Rise of AI in Weather and Climate Information and its Impact on Global Inequality

A. Mozaffari, A. Duarte, L. Teckentrup, S. Materia, G. E. C. Charnley, L. Palma, E. Baulenas Serra, D. Bojovic, P. Checchia, A. Carreric, F. Doblas-Reyes

npj Climate Action 2026

Historical Reconstruction and Future Projection of Land Surface Boundary Conditions

A. Mozaffari, M. Castaño, S. Materia, A. Duarte

NeurIPS Tackling Climate Change with Machine Learning workshop, 2025

A modular framework to run AI-based models from high-resolution climate projections

A. Gaya i Àvila, **A. Mozaffari**, A. Duarte, O. Tinto

NeurIPS Tackling Climate Change with Machine Learning workshop, 2025

CLGAN: a generative adversarial network (GAN)-based video prediction model for precipitation nowcasting

Y. Ji, B. Gong, M. Langguth, **A. Mozaffari**, X. Zhi

Geoscientific Model Development, 2023

End-to-End Process Orchestration of Earth Observation Data Workflows with Apache Airflow on High Performance Computing

L. Tian, R. Sedona, **A. Mozaffari**, E. Kreshpa, C. Paris, M. Riedel, M. G. Schultz, G. Cavallaro

IEEE International Symposium on Geoscience and Remote Sensing, 2023

Temperature forecasting by deep learning methods

B. Gong, M. Langguth, Y. Ji, **A. Mozaffari**, S. Stadtler, K. Mache, and M. G. Schultz

Geoscientific Model Development, 2022

Advancing caching and automation with FDO

A. Mozaffari, N. Selke, M. G. Schultz

Research Ideas and Outcomes, 2022

HPC-oriented Canonical Workflows for Machine Learning Applications in Climate and Weather Prediction

A. Mozaffari, M. Langguth, B. Gong, J. Ahring, A. Rojas Campos, P. Nieters, O. J. Campos Escobar, M. Wittenbrink, P. Baumann, M. G. Schultz

Data Intelligence, 2022

Canonical Workflows to Make Data FAIR

P. Wittenburg, A. Hardisty, Y. Le Franc, **A. Mozaffari**, L. Peer, N. A. Skvortsov, Z. Zhao, A. Spinuso

Data Intelligence, 2022

Enabling Canonical Analysis Workflows Documented Data Harmonization on Global Air Quality Data

S. Schröder, E. Epp, **A. Mozaffari**, M. Romberg, N. Selke, M. G. Schultz

Data Intelligence, 2022

Artificial intelligence for air quality

M. G. Schultz, F. Kleinert, L. Leufen, C. Betancourt, S. Schröder, B. Gong, S. Stadtler, M. Langguth, **A. Mozaffari**

The Project Repository Journal, 2022

3-D Electromagnetic Modeling Explains Apparent-Velocity Increase in Crosshole GPR Data: Borehole Fluid Effect Correction Method Enables Incorporating High-Angle Traveltime Data

A. Mozaffari, A. Klotzsche, Z. Zhou, H. Vereecken, J. van der Kruk

IEEE Transactions on Geoscience and Remote Sensing, 2021

JUWELS Booster – A Supercomputer for Large-Scale AI Research

S. Kesselheim, A. Herten, K. Krajsek, J. Ebert, J. Jitsev, M. Cherti, M. Langguth, B. Gong, S. Stadtler, **A. Mozaffari**, G. Cavallaro, R. Sedona, A. Schug, A. Strube, R. Kamath, M. G. Schultz, M. Riedel, T. Lippert

High Performance Computing, 2021

Can deep learning beat numerical weather prediction?

M. G. Schultz, C. Betancourt, B. Gong, F. Kleinert, M. Langguth, L. Leufen,
A. Mozaffari, S. Stadler

*Philosophical Transactions of the Royal Society A: Mathematical, Physical and
Engineering Sciences, 2021*