

Amirpasha Mozaffari

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Research interests

Data Science, Machine Learning (ML), Earth System Sciences (ESS), High-Performance Computing (HPC), Open and Findable, Accessible, Reusable, Interoperable (FAIR) science

Research experience

Team leader: Workflow & Open Science Jülich, Germany
[Jülich Supercomputing Center \(JSC\)](#) since 2022
Managing a group of five computer and Geo scientists with focus on ML workflow for ESS for HPC and data management/ Coordination of computing project with more than sixty members/ Advancing the FAIR and reproducible ML and application of FAIR Digital Object in HPC

Data & Workflow Manager Jülich, Germany
[Jülich Supercomputing Center \(JSC\)](#) 2019 – 2022
Workflow specialist for ML application for air quality and weather forecast/ Data manager of multiple ESS project/ coordinator and reviewer of compute and data projects for HPC system/ website development and maintenance

Research Assistant Jülich, Germany
[IBG-3: Agrosphäre](#) 2015 – 2019
Development and optimization of numerical modeling and inversion algorithms for synthetic and experimental data for HPC system/ Advancing the workflow for massive parallel computation of single models on HPC/ developing analytical solutions for shortcomings in practical environmental problems

Student Assistant Jülich, Germany
[IBG-3: Agrosphäre](#) 2014
Improving the performance of environmental monitoring systems by numerical modeling and sensitivity analysis

Education

RWTH Aachen University Aachen, Germany
Dr.rer.nat (PhD) in Geoscience, 2015 – 2022
Towards 3D crosshole GPR full-waveform inversion
Mentors: Prof. Dr. Klaus Reicherter & Prof. Dr. Harry Vereecken
Supervisor: Prof. Dr. Ir. Jan van der Kruk

University of Stuttgart Stuttgart, Germany
M.Sc in Water Resources Eng.& Man. 2011 – 2014

Mentor: Prof. Johan Alexander Huisman

Amirkabir University of Technology

Tehran, Iran

BSc. Eng. in Mining Engineering

2007 – 2011

Mentor: Prof. Morteza Osanloo

Skills

Digital Skills

Programming : Python (TF., PyTorch, Xarray, Pandas...), Shell, Matlab, C, HTML, Git, Containers (Docker, Singularity)

Data Management: netCDF, GRIB, HDF5

Distributed Sys.: MPI, OpenMP, Multithreading, Dask, Airflow, Slurm

Language Skills

Farsi/Persian (fluent), English (advanced), German (intermediate)

Management and Leadership Skills

Co-Chair the FAIR Digital Object Forum

since 2021

Representative of JSC at NFDI4Earth consortium

since 2022

Organizational Skills

Coordinator of DeepACF computing project and multiple data projects with more than 50 users. since 2019

Organizer of MAELSTROM Boot Camp 2022: Machine Learning for Weather and Climate at Forschungszentrum Jülich. 2022

Community

Active member of Research Data Alliance (RDA)

Active member of FAIR Digital Object Forum (FAIRDO)

Reviewer for Software-Practice & Experience, Data Intelligence and guest editor for Data Intelligence

Talks & tutorials

Advancing caching and automation with FDO

2022

International FDO2022, Leiden, The Netherlands

Advancing FAIRness for global air quality data analyses

2022

International Data Week IDW2022, Seoul, South Korea

Canonical workflow for ML application on HPC

2021

FDO Forum

FAIRness in the multi-services data infrastructure of the Tropospheric Ozone Assessment Report (TOAR) and Artificial Intelligence for Air Quality (IntelliAQ) project 2020

Poster presentation in RDA Virtual Plenary 15, Melbourne , Australia

PyStager: simple parallelization solution for HPC 2020
ESM forum 2020, Jülich, Germany

On the use of containers for machine learning and visualization workflows on JUWELS 2020
Poster presentation in NIC Symposium 2020, Jülich, Germany

A detailed 3D crosshole GPR Antenna model 2017
Presentation in GPR round table, Aachen, Germany

Towards 3D crosshole GPR FWI 2016
Poster presentation in AGU fall meeting, San Francisco, United States

2.5D crosshole GPR FWI 2016
Presentation in 16th IGPRC, Hong Kong, Hong Kong

Towards 3D crosshole GPR FWI 2016
Presentation in near surface FWI workshop, Zürich, Switzerland

Towards 3D crosshole GPR FWI 2015
Presentation in GPR round table, Aachen, Germany

Publications

CLGAN: A GAN-based video prediction model for precipitation now-casting
Ji Y., Gong B., Langguth M., **Mozaffari, A.**, Zhi X.
EGUsphere, 2022- preprint.

Advancing caching and automation with FDO
Mozaffari, A., Selke N., Schultz M.
RIO, 2022

Temperature forecasting by deep learning methods
Gong B., Langguth M., Ji Y., **Mozaffari, A.**, Stadler S., Mache K., Schultz M.
GMD, 2022

Towards 3D crosshole GPR full-waveform inversion
Mozaffari, A.
RWTH Aachen, 2022

Enabling Canonical Analysis Workflows Documented Data Harmonization on Global Air Quality Data
Schröder S., Epp E., **Mozaffari, A.**, Romberg M., Selke N., Schultz M.
Data Intelligence, 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.

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 to Incorporating High-Angle Traveltime Data

Mozaffari, A., Klotzsche, A., Zhou, Z., Vereecken, H., van der Kruk, J.
IEEE TGRS, 2021.

Can deep learning beat numerical weather prediction?

Schultz, M., Betancourt, C., Gong, B., Kleinert, F., Langguth, M., Leufen, L., Mozaffari, A., Stadtler, S.
Philosophical Transactions of The Royal Society A Mathematical Physical and Engineering Sciences, 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

2.5D crosshole GPR full-waveform inversion with synthetic and measured data

Mozaffari, A., Klotzsche, A., Warren, C., He, G., Giannopoulos, A., Vereecken, H., van der Kruk, J.
Geophysics, 2020.

GPR full-waveform inversion, recent developments, and future opportunities

van der Kruk, J., Liu, T., Mozaffari, A., Gueting, N., Klotzsche, A., Vereecken, H., Warren, C., Giannopoulos, A.

ICGPR, 2018.

Towards 3D full-waveform inversion of crosshole GPR data

Mozaffari, A., Klotzsche, A., He, G., Warren, C., Giannopoulos, A., Vereecken, H., van der Kruk, J.

ICGPR, 2016.

Crosshole GPR full-waveform inversion and waveguide amplitude analysis: Recent developments and new challenges

Klotzsche, A., van der Kruk, J., **Mozaffari, A.**, Gueting, N., & Vereecken, H.

IWAGPR, 2015.