Diego Domenzain • PhD GeoPhysics & Seismology • MSc Mathematics • BSc Mathematics

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Research scientist specializing in numerical modeling & optimization methods.

- Numerical modeling of partial differential equations.
- Fortran, C, openMP, Slurm, Matlab, Shell, Python, Julia.
- Scientific, parallel and cloud computing.
- Combinatoric optimization methods.
- Design of non-linear optimization methods.
- Digital signal processing of time series.
- Uncertainty quantification of observed data.
- Iterative image processing techniques.
- Deep learning methods for pic2pic mapping.
- Full-waveform inversion of radar data.

Selected work

- Led the development and realization of a new subsurface DCIP monitoring system in partnership with Ejlskov A/S: planning instrument tests, enhancing new instrumentation, developing new signal processing routines, and implementing new optimization methods. Efficiency in data acquisition time, signal processing, computation, and model resolution increased by two orders of magnitude. +1 year
- Wrote numerical modeling of partial differential equations in 2D & 3D using high performance computing. Specifically for non-homogeneous media, time-domain elastic and electromagnetic waves, and steady state processes (Fortran & openMP, Slurm, Matlab). +7 years of experience in numerical methods.
- Developed and implemented non-linear optimization algorithms to recover heterogeneous physical properties using electromagnetic observations (Fortran & openMP, Slurm, Matlab). Efficiency in computation and resolution over two orders of magnitude in time, space, and memory than previous research.
- Implemented numerical methods in the cloud using high performance & parallel computing (Fortran & openMP, Slurm, Matlab). +4 years of experience.
- Quantified uncertainty & reduced noise of physically observed data without using machine learning. From 50% noise to 90% signal in time-domain observed data.
- Well versed in spoken, visual, and written scientific communication catered to different audiences. Have attended +10 conferences and published +4 peer reviewed papers as first author.
- Recipient of National Science Foundation (NSF-US), and Teaching Assistant grants for PhD and Master studies respectively. Both grants covered full tuition and stipend (∼50k usd per year).
- I enjoy learning and implementing different applied numerical routines (Fortran, C, Matlab, Python, Julia). The site alles hosts all these +20 projects ranging from pic2pic deep learning, covid modeling, Markowitz portfolio, self-organizing maps, graph signal processing, Dijkstra's algorithm, joint inversion & more.

Experience

Aarhus University 2021 — *Post-doctoral Researcher* in the Hydro-Geophysics Group
Colorado School of Mines 2020-2021 — *Post-doctoral Researcher* in the Geophysics Department
Boise State University 2015 - 2019 — *Ph.D.* Geophysics & Seismology (GPA 3.76/4)
Michigan Technological University 2012 - 2014 — *MSc.* Discrete Mathematics (GPA 3.45/4)

Scientific peer-reviewed publications

Joint full-waveform ground-penetrating radar and electrical resistivity inversion applied to field data acquired on the surface. Geophysics 87, (2022): K1-K17. Diego Domenzain, John Bradford, Jodi Mead.

Efficient inversion of 2.5D electrical resistivity data using the discrete adjoint method. Geophysics 86, (2021): 1-54. Diego Domenzain, John Bradford, Jodi Mead.

Joint inversion of full-waveform inversion GPR and ER data. Part 1. Geophysics 85, no.6 (2020): 1-72. Diego Domenzain, John Bradford, Jodi Mead.

Joint inversion of full-waveform inversion GPR and ER data. Part 2. Geophysics 85, no.6 (2020): 1-74. Diego Domenzain, John Bradford, Jodi Mead.