

Aarhus University
Geophysics
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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.

Selected work

- 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](#).
- Development and implementation of 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](#).
- Implementation of numerical methods in the cloud using high performance & parallel computing (Fortran & openMP, Slurm, Matlab). [+4 years of experience](#).
- Uncertainty quantification & noise reduction of physically observed data. [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](#).
- Worked close with a remediation company ([Ejlskov A/S](#)) 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](#).
- 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

Colorado School of Mines 2020-2021

Boise State University 2015 - 2019

Michigan Technological University 2012 - 2014

Post-doctoral Researcher in the Hydro-Geophysics Group

Post-doctoral Researcher in the Geophysics Department

Ph.D. Geophysics & Seismology (GPA 3.76/4)

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.