
# Diego Domenzain

Geophysics and Data Science

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## About

I am interested in applying physics, mathematics and high performance computing for the betterment of humanity and exploration of reality.

I acquire, analyze and process big volumes of data using math and physics by designing and deploying computational algorithms.

I specialize in scientific computing, numerical methods, forward models, inverse problems, imaging methods, geophysics and machine learning.

Previous interests include graph theory, error correcting codes, finite geometries and combinatorics.

I also like drawing, swimming and climbing.

## Coding in

Matlab • Python • Bash
Slurm • Pytorch
TensorFlow
Fortran • Julia • Latex

## Skills

geophysics • machine learning
inverse methods • forward models
high performance computing
scientific computing
algorithm design
image & signal processing
data visualization

## Experience

Postdoctoral Researcher
Colorado School of Mines (CSM). 2020 - current

Ph.D. Geophysics
Boise State University (BSU). 2015 - 2019

MSc. Discrete Mathematics
Michigan Technological University (MTU). 2012 - 2014

## Selected Publications

*Joint inversion of full-waveform inversion GPR and ER data. Part 1*. Geophysics - In review. Diego Domenzain, John Bradford, Jodi Mead.

*Joint inversion of full-waveform inversion GPR and ER data. Part 2*. Geophysics - In review. Diego Domenzain, John Bradford, Jodi Mead.

*Efficient inversion of 2.5D electrical resistivity data using the discrete adjoint method*. Geophysics - In review. Diego Domenzain, John Bradford, Jodi Mead.

## Code

### Gerjoii

Matlab • Bash • Slurm • Python • Pytorch

- 2D Forward modeling of radar and electrical resistivity.
- Novel joint multi-parameter optimization algorithm that recovers electrical parameters of the subsurface from radar and resistivity data.
- Embedded cross-gradients routine that improves structural sensitivities.
- Machine learning routine for finding inversion weights.
- 2.5D Electrical resistivity inversion algorithm that is capable of handling very fine discretization domains with very low computer memory requirements.

### Wave utils

Matlab

Code suite for processing waveforms as recorded by receivers in the field. Features include: frequency domain filtering, beamforming analysis, frequency time analysis, multichannel analysis of surface waves, and virtual source gathers by seismic interferometry.

## Current Project

TensorFlow • Keras • Python

Joint inversion of radar and electrical resistivity data enhanced by Machine Learning:

Using a minimal set of data examples to generate a starting model for a deterministic inversion, and employing a modified GAN approach to generate subsurface model parameters.