Diego Domenzain

Geophysics and Data Analysis

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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
Fortran • Julia • Latex

Skills

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

Education

Ph.D. Geophysics
Boise State University (BSU). Fall 2019

MSc. Discrete Mathematics
Michigan Technological University (MTU). Summer 2014

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.

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

Forward modeling of ground penetrating radar and electrical resistivity together with a novel 2.5d joint multi-parameter inversion algorithm that recovers electrical permittivity and conductivity of the subsurface from surface acquired radar and resistivity data. Cross-gradients routine to improve structural sensitivities. Machine learning routine for finding inversion weights. Over 100,000 lines of code.

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.

Conferences

Joint inversion of GPR and ER data using the adjoint method. AGU Fall meeting 2018. Diego Domenzain, John Bradford, Jodi Mead.

Joint inversion of GPR and ER data. SEG Fall meeting 2018. Diego Domenzain, John Bradford, Jodi Mead.

Imaging by joint inversion of electromagnetic waves and DC currents. SIAM meeting 2017. Diego Domenzain, John Bradford, Jodi Mead.

Imaging by joint inversion of electromagnetic waves and DC currents. SAGEEP 2017. Diego Domenzain, John Bradford, Jodi Mead.

Forward modeling of ground penetrating radar and electric resistivity tomography using FDTD and FV methods. AGU Fall meeting 2016. Diego Domenzain, John Bradford, Jodi Mead.

AGU = American Geophysical Union. SEG = Society of Exploration Geophysics. SAGEEP = Symposium on the Application of Geophysics to Engineering and Environmental Problems. SIAM = Society of Industrial and Applied Mathematics.