

Joseph Jennings

PH.D CANDIDATE · COMPUTATIONAL GEOPHYSICAL IMAGING

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Education

2015-2021 **Ph.D. in Geophysics**, Stanford University · GPA: 4.0 *Stanford, CA*
2009-2014 **B.S. in Geophysical Engineering**, Colorado School of Mines · GPA: 3.94 (*Summa Cum Laude*) *Golden, CO*

Skills

Programming C++, C, Python, Java, Fortran, bash, MATLAB, \LaTeX
Systems/Tools vim, git, systemd, NFS/NIS, Unix
Software TensorFlow, Keras, scikit-learn

Industry Experience

Research Intern

San Francisco, CA & Houston, TX

SHELL

Summer 2017, 2018, 2019

- Developed deep learning tools for inverse imaging and applied them to the seismic imaging problem
- Compared the use of deep convolutional networks and fully-connected networks for solving inverse problems
- Explored network generalization by training on synthetically generated data and then applying on real seismic recordings

Software Engineer

Denver, CO

ION GEOPHYSICAL

May 2014 - Dec. 2014

- Developed and maintained signal processing and seismic imaging/inversion software (C, C++, Lisp, Lua)
- Deployed software on a proprietary massively-parallel data processing system

Software consultant

Denver, CO

EMERALD OIL

Dec 2013 - May. 2014

- Converted C# oil recovery forecasting software into CUDA to increase software performance
- Performed extensive benchmarking tests on CUDA and C# code to measure performance

Research Experience

Ph.D. Research Assistant

Stanford, CA

STANFORD UNIVERSITY, *Advisor: Biondo Biondi*

June 2015 - Present

- **Area of research:** Seismic imaging
- **Thesis topic:** Combining inverse scattering and adaptive noise canceling for imaging in the presence of strong coherent noise
- **Interests:** PDE-constrained optimization, numerical modeling, signal processing and deep learning for inverse imaging

Undergraduate researcher

Golden, CO

COLORADO SCHOOL OF MINES, *Advisor: Dave Hale*

July 2013 - May 2014

- **Area of research:** image processing, GPU programming, software portability
- Developed a GPU code in OpenCL for anisotropic- diffusion filtering of seismic images
- Used a red-black ordering scheme to avoid race conditions

Teaching Experience

Spring 2019 **Graduate CA** Adaptive Signal Processing (EE 373A) Stanford University *Stanford, CA*

Winter 2020 **Graduate CA** Environmental Soundings Image Estimation (GP 211) Stanford University *Stanford, CA*

Publications

CONFERENCE ABSTRACTS

- 2019 **Up-down separation and debubble using a multicomponent non-stationary prediction-error filter** *SEG*
K. Wang, **J. Jennings**, and J. Claerbout
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Wang-2019-udspef.pdf
- 2019 **Estimating signal and structured noise in ultrasound data using prediction-error filters** *SPIE Medical imaging*
J. Jennings, M. Jakovljevic, E. Biondi, J. Dahl and B. Biondi
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Jennings-2019-usclutterpef.pdf
- 2019 **Multiparameter FWI with Near-Interface Sources using Staggered-grid Finite Differences** *SIAM Geosciences*
J. Jennings, M. Almquist, and E. Dunham
sep.stanford.edu/data/media/public/sep/joseph29/pubs/2019-03-12-sbpsiam.pdf
- 2018 **Multicomponent deblending of marine data using a pattern-based approach** *SEG*
J. Jennings, R. Clapp, B. Biondi, and S. Ronen
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Jennings-2018-patterbasedmc.pdf
- 2018 **Combining direct imaging of blended data and data-space deblending using a pattern-based approach** *SEG*
J. Jennings, B. Biondi, R. Clapp, and S. Ronen
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Jennings-2018-combined.pdf
- 2018 **Tomography: a Deep Learning vs FWI comparison** *EAGE workshop*
S. Farris, M. Araya-Polo, **J. Jennings**, R. Clapp, and B. Biondi
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Farris-2018-dlvsfwi.pdf
- 2017 **Source signature of ocean-bottom node data using deterministic airgun modeling** *SEG*
L. Watson, **Joseph Jennings**, and S. Ronen
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Watson-2017-desig.pdf
- 2017 **Simultaneous source deblending with the radially and source similarity attributes** *SEG*
J. Jennings, S. Ronen
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Jennings-2017-radiality.pdf

PROFESSIONAL MAGAZINES

- 2018 **Deep Learning Tomography** *The Leading Edge*
M. Araya-Polo, **J. Jennings**, A. Adler, and T. Dahlke
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Araya-2018-dltomo.pdf

INVITED TALKS

- 2018 **Multicomponent deblending of marine data using a pattern-based approach** *EAGE workshop*
J. Jennings, R. Clapp, B. Biondi, and S. Ronen
sep.stanford.edu/data/media/public/sep/joseph29/pubs/Jenningsmamu2018.pdf

BOOK CHAPTERS

- 2019 **Fast and Accurate Tomography via Deep Learning** *Deep Learning: Algorithms and Applications*
M. Araya-Polo, A. Adler, S. Farris, and **J. Jennings**
springer.com/gp/book/9783030317591#aboutBook

Stanford Graduate Coursework

Winter 2016	Applied Fourier Analysis and Elements of Modern Signal Processing (CME 372)	E. Candes
Winter 2016	Environmental Soundings Image Estimation (GEOPHYS 211)	J. Claerbout
Spring 2016	Mathematical Methods of imaging (MATH 221)	G. Papanicolaou
Spring 2016	3D Seismic Imaging (GEOPHYS 281)	B. Biondi
Winter 2017	Introduction to Computational Earth Sciences (GEOPHYS 257)	R. Clapp
Fall 2017	Machine Learning (CS 229)	A. Ng and D. Boneh
Winter 2018	Adaptive Signal Processing (EE 373)	B. Widrow
Winter 2019	Advanced Ultrasound Imaging (RAD 230)	J. Dahl
Fall 2019	Imaging with Incomplete Information (CEE 362)	P. Kitanidis