

Ali Siahkoohi

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Last updated: January 2022

EDUCATION

Georgia Institute of Technology

September 2016 – August 2022 (expected)

756 W Peachtree St NW, Floor 13, Atlanta, GA 30308, USA

Doctor of Philosophy in Computational Science and Engineering

- Degree Advisor: [Felix J. Herrmann](#)

University of Tehran

September 2013 – March 2016

North Kargar St, Tehran, Tehran, Iran

Master of Science in Geophysics

- Degree Advisor: [Ali Gholami](#)

Sharif University of Technology

September 2008 – August 2013

Azadi Ave., Tehran, Tehran, Iran

Bachelor of Science in Electrical Engineering

RESEARCH INTERESTS

Deep Learning, Natural Language Processing, Inverse Problems, Uncertainty Quantification, Signal Processing

RESEARCH EXPERIENCE

Google

Research Intern

August 2021 – December 2021

Georgia Institute of Technology

Graduate Research Assistant

February 2018 – Present

The University of British Columbia

Graduate Research Assistant

September 2016 – January 2018

TEACHING EXPERIENCE

Georgia Institute of Technology

Graduate Teaching Assistant

- Computational Foundations of Machine Learning
- Imaging with Data-Driven Models
- Numerical Analysis I

January 2022 – April 2022

September 2019 – December 2019

September 2018 – December 2018

Sharif University of Technology

Teaching Assistant

- Signals and Systems
- Digital Signal Processing
- Linear Algebra
- Principles of Electrical Engineering Laboratory

January 2011 – May 2011

January 2011 – May 2011

September 2010 – December 2010

September 2009 – December 2009

PROGRAMMING SKILLS

Languages: Python, Julia, C, MATLAB, Bash

Machine Learning Libraries: TensorFlow, PyTorch, Flux.jl

Cloud Services Platform: Amazon Web Services (AWS)

Message Passing Standard: MPI

PUBLICATIONS

- [1] Yuxiao Ren, Philipp A. Witte, **Ali Siahkoohi**, Mathias Louboutin, and Felix J. Herrmann. “Seismic Velocity Inversion and Uncertainty Quantification Using Conditional Normalizing Flows”. In: *American Geophysical Union (AGU) Fall Meeting*. Dec. 2021. URL: <https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/815883>.
- [2] Rafael Orozco, **Ali Siahkoohi**, Gabrio Rizzuti, Tristan van Leeuwen, and Felix J. Herrmann. “Photoacoustic imaging with conditional priors from normalizing flows”. In: *NeurIPS 2021 Workshop on Deep Learning and Inverse Problems*. 2021. URL: <https://openreview.net/forum?id=woi1OTvROO1>.
- [3] **Ali Siahkoohi**, Gabrio Rizzuti, and Felix J. Herrmann. “Deep Bayesian inference for seismic imaging with tasks”. Oct. 2021. URL: <https://arxiv.org/abs/2110.04825>.
- [4] Mathias Louboutin, **Ali Siahkoohi**, Rongrong Wang, and Felix J. Herrmann. “Low-memory stochastic backpropagation with multi-channel randomized trace estimation”. June 2021. URL: <https://arxiv.org/abs/2106.06998>.
- [5] **Ali Siahkoohi** and Felix J. Herrmann. “Learning by example: fast reliability-aware seismic imaging with normalizing flows”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2021, pp. 1580–1585. DOI: 10.1190/segam2021-3581836.1. URL: <https://arxiv.org/abs/2104.06255>.
- [6] Rajiv Kumar, Maria Kotsi, **Ali Siahkoohi**, and Alison Malcolm. “Enabling uncertainty quantification for seismic data pre-processing using normalizing flows (NF)—an interpolation example”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2021, pp. 1515–1519. DOI: 10.1190/segam2021-3583705.1. URL: <https://slim.gatech.edu/Publications/Public/Conferences/SEG/2021/kumar2021SEGeuq/kumar2021SEGeuq.pdf>.
- [7] **Ali Siahkoohi**, Gabrio Rizzuti, Mathias Louboutin, Philipp Witte, and Felix J. Herrmann. “Preconditioned training of normalizing flows for variational inference in inverse problems”. In: *3rd Symposium on Advances in Approximate Bayesian Inference*. Jan. 2021. URL: <https://openreview.net/pdf?id=P9m1sMaNQ8T>.
- [8] **Ali Siahkoohi**, Gabrio Rizzuti, Mathias Louboutin, and Felix J. Herrmann. “Unsupervised data-guided uncertainty analysis in imaging and horizon tracking”. In: *3rd Annual Meeting of the SIAM Texas-Louisiana Section*. Oct. 2020.
- [9] **Ali Siahkoohi**, Philipp A. Witte, Mathias Louboutin, Felix J. Herrmann, and Gabrio Rizzuti. “Seismic Imaging with Uncertainty Quantification: Sampling from the Posterior with Generative Networks”. In: *SIAM Conference on Imaging Science*. IS20. July 2020.
- [10] **Ali Siahkoohi**, Gabrio Rizzuti, Philipp A. Witte, and Felix J. Herrmann. “Faster Uncertainty Quantification for Inverse Problems with Conditional Normalizing Flows”. In: *Tech. rep. TR-CSE-2020-2, Georgia Institute of Technology*. July 2020. URL: <https://arxiv.org/abs/2007.07985>.
- [11] Gabrio Rizzuti, **Ali Siahkoohi**, Philipp A. Witte, and Felix J. Herrmann. “Parameterizing uncertainty by deep invertible networks, an application to reservoir characterization”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2020, pp. 1541–1545. DOI: 10.1190/segam2020-3428150.1. URL: <https://arxiv.org/abs/2004.07871>.
- [12] Mi Zhang, **Ali Siahkoohi**, and Felix J. Herrmann. “Transfer learning in large-scale ocean bottom seismic wavefield reconstruction”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2020, pp. 1666–1670. DOI: 10.1190/segam2020-3427882.1. URL: <https://arxiv.org/abs/2004.07388>.
- [13] **Ali Siahkoohi**, Gabrio Rizzuti, and Felix J. Herrmann. “Weak deep priors for seismic imaging”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2020, pp. 2998–3002. DOI: 10.1190/segam2020-3417568.1. URL: <https://arxiv.org/abs/2004.06835>.
- [14] **Ali Siahkoohi**, Gabrio Rizzuti, and Felix J. Herrmann. “Uncertainty quantification in imaging and automatic horizon tracking—a Bayesian deep-prior based approach”. In: *SEG Technical Program Expanded Abstracts*. Sept. 2020, pp. 1636–1640. DOI: 10.1190/segam2020-3417560.1. URL: <https://arxiv.org/abs/2004.00227>.
- [15] **Ali Siahkoohi**, Gabrio Rizzuti, and Felix J. Herrmann. “A deep-learning based Bayesian approach to seismic imaging and uncertainty quantification”. In: *82nd EAGE Conference and Exhibition 2020*. Jan. 2020. URL: <https://arxiv.org/abs/2001.04567>.
- [16] Felix J. Herrmann, **Ali Siahkoohi**, and Gabrio Rizzuti. “Learned imaging with constraints and uncertainty quantification”. In: *NeurIPS 2019 Deep Inverse Workshop*. Dec. 2019. URL: <https://arxiv.org/abs/1909.06473>.
- [17] **Ali Siahkoohi**, Mathias Louboutin, and Felix J. Herrmann. “Neural network augmented wave-equation simulation”. In: *Tech. rep. TR-CSE-2019-1, Georgia Institute of Technology*. Sept. 2019. URL: <https://arxiv.org/abs/1910.00925>.
- [18] **Ali Siahkoohi**, Rajiv Kumar, and Felix J. Herrmann. “Deep-learning based ocean bottom seismic wavefield recovery”. In: *SEG Technical Program Expanded Abstracts*. Aug. 2019, pp. 2232–2237. DOI: 10.1190/segam2019-3216632.1.

- [19] **Ali Siahkoohi**, Dirk J. Verschuur, and Felix J. Herrmann. “Surface-related multiple elimination with deep learning”. In: *SEG Technical Program Expanded Abstracts*. Aug. 2019, pp. 4629–4634. DOI: [10.1190/segam2019-3216723.1](https://doi.org/10.1190/segam2019-3216723.1).
- [20] **Ali Siahkoohi**, Mathias Louboutin, and Felix J. Herrmann. “The importance of transfer learning in seismic modeling and imaging”. In: *Geophysics* 84.6 (July 2019), A47–A52. DOI: [10.1190/geo2019-0056.1](https://doi.org/10.1190/geo2019-0056.1).
- [21] Gabrio Rizzuti, **Ali Siahkoohi**, and Felix J. Herrmann. “Learned iterative solvers for the Helmholtz equation”. In: *81st EAGE Conference and Exhibition 2019*. June 2019. DOI: [10.3997/2214-4609.201901542](https://doi.org/10.3997/2214-4609.201901542).
- [22] Felix J. Herrmann, **Ali Siahkoohi**, and Mathias Louboutin. “Machine Learning in Seismic Imaging—from Low-fidelity to High-fidelity”. In: *SIAM Conference on Computational Science and Engineering*. (SIAM CSE). Mar. 2019.
- [23] **Ali Siahkoohi**, Mathias Louboutin, Rajiv Kumar, and Felix J. Herrmann. “Deep-convolutional neural networks in prestack seismic—two exploratory examples”. In: *SEG Technical Program Expanded Abstracts*. Oct. 2018, pp. 2196–2200. DOI: [10.1190/segam2018-2998599.1](https://doi.org/10.1190/segam2018-2998599.1).
- [24] Felix J. Herrmann, Gerard J. Gorman, Jan Hückelheim, Keegan Lensink, Paul Kelly, Navjot Kukreja, Henryk Modzelewski, Michael Lange, Mathias Louboutin, Fabio Luporini, **Ali Siahkoohi**, and Philipp A. Witte. “The power of abstraction in Computational Exploration Seismology”. In: *Smoky Mountains Computational Sciences and Engineering Conference*. Aug. 2018.
- [25] **Ali Siahkoohi**, Rajiv Kumar, and Felix J. Herrmann. “Seismic Data Reconstruction with Generative Adversarial Networks”. In: *80th EAGE Conference and Exhibition 2018*. June 2018. DOI: [10.3997/2214-4609.201801393](https://doi.org/10.3997/2214-4609.201801393).
- [26] **Ali Siahkoohi** and Ali Gholami. “Sparsity Promoting Least Squares Migration for Laterally Inhomogeneous Media”. In: *7th EAGE Saint Petersburg International Conference and Exhibition*. Apr. 2016. DOI: [10.3997/2214-4609.201600223](https://doi.org/10.3997/2214-4609.201600223).
- [27] Mohammad Sadegh Ebrahimi, Mohammad Hossein Daraei, Jamshid Rezaei, and **Ali Siahkoohi**. “A Novel Utilization of Wireless Sensor Networks as Data Acquisition System in Smart Grids”. In: *Materials Science and Information Technology*. Vol. 433. Advanced Materials Research. Trans Tech Publications, Jan. 2012, pp. 6725–6730. DOI: [10.4028/www.scientific.net/AMR.433-440.6725](https://doi.org/10.4028/www.scientific.net/AMR.433-440.6725).
- [28] Amir Najafi, **Ali Siahkoohi**, and Mohammad B. Shamsollahi. “A content-based digital image watermarking algorithm robust against JPEG compression”. In: *2011 IEEE International Symposium on Signal Processing and Information Technology (ISSPIT)*. IEEE. Feb. 2011, pp. 432–437. DOI: [10.1109/ISSPIT.2011.6151601](https://doi.org/10.1109/ISSPIT.2011.6151601).