

ZIYI (FRANCIS) YIN

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Last update: Aug 2022

EDUCATION

Georgia Institute of Technology

Doctor of Philosophy in Computational Science and Engineering

Advisor: Prof. Felix J. Herrmann

Group: Seismic Laboratory for Imaging and Modeling

Atlanta, GA

Aug 2019 - Present

Emory University

Bachelor of Science in Mathematics and Computer Science

Advisor: Prof. James G. Nagy

Atlanta, GA

May 2019

RESEARCH INTERESTS

Deep Learning, Inverse Problems, Computational Imaging, Uncertainty Quantification
Applications on Time-lapse Seismic Monitoring of Carbon Capture and Storage (CCS)

RESEARCH EXPERIENCE

Georgia Institute of Technology

Graduate Research Assistant

Atlanta, GA

Aug 2019 - Present

Emory University

Undergraduate Honors Research

Atlanta, GA

May 2018 - May 2019

PREPRINTS

- Huseyin Tuna Erdinc, Abhinav P. Gahlot, Ziyi Yin, Mathias Louboutin, and Felix J. Herrmann. “De-risking Carbon Capture and Sequestration with Explainable CO₂ Leakage Detection in Time-lapse Seismic Monitoring Images”. Jul 2022. URL: <https://slim.gatech.edu/Publications/Public/Submitted/2022/erdinc2022AAAIdcc/erdinc2022AAAIdcc.pdf>.

CONFERENCE PROCEEDINGS

- Ziyi Yin, Ali Siahkoohi, Mathias Louboutin, and Felix J. Herrmann. “Learned coupled inversion for carbon sequestration monitoring and forecasting with Fourier neural operators”. Accepted in *International Meeting for Applied Geoscience & Energy Expanded Abstracts*. May 2022. URL: <https://arxiv.org/pdf/2203.14396.pdf>.
- Mathias Louboutin, Philipp A. Witte, Ali Siahkoohi, Gabrio Rizzuti, Ziyi Yin, Rafael Orozco, and Felix J. Herrmann. “Accelerating innovation with software abstractions for scalable computational geophysics”. Accepted in *International Meeting for Applied Geoscience & Energy Expanded Abstracts*. May 2022. URL: <https://arxiv.org/pdf/2203.15038.pdf>.
- Yijun Zhang, Mathias Louboutin, Ali Siahkoohi, Ziyi Yin, Rajiv Kumar and Felix J. Herrmann. “A simulation-free seismic survey design by maximizing the spectral gap”. Accepted in *International Meeting for Applied Geoscience & Energy Expanded Abstracts*. May 2022. URL: <https://arxiv.org/pdf/2204.02801.pdf>.
- Yuxiao Ren, Philipp A. Witte, Ali Siahkoohi, Mathias Louboutin, Ziyi Yin, and Felix J. Herrmann. “Seismic velocity inversion and uncertainty quantification using conditional normalizing flows”. In: *American Geophysical Union Annual Meeting 2021*. Dec 2021. URL: <https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/815883>.

- Felix J. Herrmann, Mathias Louboutin, Ziyi Yin, and Philipp A. Witte. “Low-cost time-lapse seismic imaging of CCS with the joint recovery model”. In: *2021 IMAGE Workshop on Geophysical Challenges in Presalt Carbonates*. Oct 2021. URL: <https://slim.gatech.edu/content/low-cost-time-lapse-seismic-imaging-ccs-joint-recovery-model>.
- Ziyi Yin, Mathias Louboutin, Felix J. Herrmann. “Compressive time-lapse seismic monitoring of carbon storage and sequestration with the joint recovery model”. In: *First International Meeting for Applied Geoscience & Energy Expanded Abstracts*. Sep 2021. DOI: [10.1190/segam2021-3569087.1](https://doi.org/10.1190/segam2021-3569087.1).
- Mathias Louboutin, Ziyi Yin, Yijun Zhang, and Felix J. Herrmann. “Sparsity promoting least-squares migration for long offset sparse OBN”. In: *2020 SEG Workshop on Promises and Challenges with Sparse Node Ultra-long Offset OBN Acquisition in Imaging and Earth Model Building*. Oct 2020. URL: <https://slim.gatech.edu/content/sparsity-promoting-least-squares-migration-long-offset-sparse-obn>.
- Ziyi Yin, Rafael Orozco, Philipp A. Witte, Mathias Louboutin, Gabrio Rizzuti, and Felix J. Herrmann. “Extended source imaging, a unifying framework for seismic & medical imaging”. In: *SEG Technical Program Expanded Abstracts 2020*. Sep 2020. DOI: [10.1190/segam2020-3426999.1](https://doi.org/10.1190/segam2020-3426999.1).

TECHNICAL REPORTS

- Thomas J. Grady II, Rishi Khan, Mathias Louboutin, Ziyi Yin, Philipp A. Witte, Ranveer Chandra, Russell J. Hewett, and Felix J. Herrmann. “Model-Parallel Fourier Neural Operators as Learned Surrogates for Large-Scale Parametric PDEs”. Apr 2022. URL: <https://arxiv.org/pdf/2204.01205.pdf>.

THESES

- Ziyi Yin. “Edge Detection and Enriched Subspaces”. *Undergraduate honors thesis for Bachelor of Sciences with Highest Honors at Emory University*. May 2019. URL: <https://etd.library.emory.edu/concern/etds/7w62f916x?locale=en>.

TALKS

- “Julia for Geoscience”. In: *Transform 2022*. Apr 2022. URL: <https://www.youtube.com/watch?v=HyWfp3NzIbg>.
- “Abstractions for at-scale seismic inversion” (*contributed*). In: *Rice Oil and Gas High Performance Computing Conference 2022*. Mar 2022. URL: <https://youtu.be/scRTbP8w6Wk?t=4542>.
- “Improved seismic monitoring of CO2 sequestration with the weighted joint recovery model”. In: *ML4Seismic Partners Meeting 2021*. Nov 2021. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2021/yin2021ML4SEISMICism/Tue-11-20-Yin.html>.
- “Compressive time-lapse seismic monitoring of carbon storage and sequestration with the joint recovery model”. In: *International Meeting for Applied Geoscience & Energy Session TL 1: “Advances and Case Studies”*. Sep 2021. <https://slim.gatech.edu/Publications/Public/Conferences/SEG/2021/yin2021SEGts/yin2021SEGts.mp4>.
- “Low-cost & robust seismic monitoring of carbon storage and sequestration with the joint recovery model”. In: *Georgia Tech Geophysics Seminar*. Sep 2021.
- “Edge Detection and Enriched Subspaces”. In: *Undergraduate honors thesis defense*. April 2019.

TEACHING EXPERIENCE

Georgia Institute of Technology	Atlanta, GA
Graduate Teaching Assistant for Seismic Monitoring CO2 Storage	Spring 2022
Head Graduate Teaching Assistant for Computational Data Analysis	Fall 2021
Graduate Teaching Assistant for Exploration Seismology	Spring 2021
Graduate Teaching Assistant for Iterative Methods for Systems of Equations	Fall 2020
Emory University	Atlanta, GA
EPASS Peer Tutor for Probability and Statistics I & II	Fall 2018, Spring 2019
EPASS Peer Tutor for Foundation of Mathematics	Summer & Fall 2018, Spring 2019

ACADEMIC SERVICE

SciMLCon 2022 conference reviewer	Feb 2022
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COMMUNITY SERVICE

Georgia Institute of Technology Geophysical Society	Atlanta, GA
<i>President</i>	Oct 2020 - Present
<i>Secretary</i>	Nov 2019 - Oct 2020
Office of Undergraduate Studies, Emory University	Atlanta, GA
<i>Academic Fellow</i>	Aug 2018 - May 2019

HONORS AND AWARDS

SEG Field Camp grant	May 2022
SEG Technical Program Registration grant	Aug 2021
SEG/Chevron Student Leadership Symposium travel grant	Jun 2020
Graduate with Highest Honors (<i>summa cum laude</i>), Emory University	May 2019
Phi Beta Kappa Honor Society Membership	Apr 2019
Dean's List, Emory University	Aug 2017 - May 2019

SKILLS

Languages: Python, Julia, MATLAB, Java, C/C++, Bash, SQL, PHP, R, MPI
Machine Learning Libraries: PyTorch, Tensorflow, Flux.jl
Cloud Service Platforms: Amazon Web Services (AWS), Microsoft Azure
Document Preparation Systems: Markdown, L^AT_EX