

ZIYI (FRANCIS) YIN

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EDUCATION

Georgia Institute of Technology	Atlanta, GA
<i>Doctor of Philosophy in Computational Science and Engineering</i>	Aug 2019 - Present
<i>Master of Science in Computational Science and Engineering</i>	May 2023
Advisor: Prof. Felix J. Herrmann	
Group: Seismic Laboratory for Imaging and Modeling	

Emory University	Atlanta, GA
<i>Bachelor of Science in Mathematics and Computer Science</i>	May 2019
Advisor: Prof. James G. Nagy	

RESEARCH INTERESTS

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

WORK EXPERIENCE

Georgia Institute of Technology	Atlanta, GA
<i>Graduate Research Assistant</i>	Aug 2019 - Present

Pactera	Dalian, China
<i>AI intern</i>	May 2019 - Aug 2019

Emory University	Atlanta, GA
<i>Undergraduate Honors Research</i>	May 2018 - May 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

PROFESSIONAL SERVICE

Georgia Tech President's Undergraduate Research Award (PURA) reviewer	Oct 2022
SciMLCon 2022 conference reviewer	Feb 2022
Journal of Open Source Software reviewer	

COMMUNITY SERVICE

Georgia Institute of Technology Geophysical Society	Atlanta, GA
<i>President</i>	Oct 2020 - Sep 2022
<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

PREPRINTS

- 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. DOI: [10.48550/arXiv.2204.01205](https://doi.org/10.48550/arXiv.2204.01205).

JOURNAL PUBLICATIONS

- **Ziyi Yin**, Huseyin Tuna Erdinc, Abhinav Prakash Gahlot, Mathias Louboutin, and Felix J. Herrmann. “De-risking geological carbon storage from high resolution time-lapse seismic to explainable leakage detection”. Jan 2023. In: *The Leading Edge*. DOI: [10.1190/tle42010306.1](https://doi.org/10.1190/tle42010306.1).

CONFERENCE PROCEEDINGS

- Huseyin Tuna Erdinc*, Abhinav Prakash 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”. Aug 2022. In: *AAAI 2022 Fall Symposium - The Role of AI in Responding to Climate Challenges*. DOI: [10.48550/arXiv.2212.08596](https://doi.org/10.48550/arXiv.2212.08596).
- **Ziyi Yin**, Ali Siahkoohi, Mathias Louboutin, and Felix J. Herrmann. “Learned coupled inversion for carbon sequestration monitoring and forecasting with Fourier neural operators”. In: *Second International Meeting for Applied Geoscience & Energy Expanded Abstracts*. Aug 2022. DOI: [10.1190/image2022-3722848.1](https://doi.org/10.1190/image2022-3722848.1).
- 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”. In: *Second International Meeting for Applied Geoscience & Energy Expanded Abstracts*. Aug 2022. DOI: [10.1190/image2022-3750561.1](https://doi.org/10.1190/image2022-3750561.1).
- 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”. In: *Second International Meeting for Applied Geoscience & Energy Expanded Abstracts*. Aug 2022. DOI: [10.1190/image2022-3751690.1](https://doi.org/10.1190/image2022-3751690.1).
- 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).

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

- “Uncertainty-aware time-lapse CO2 monitoring with learned end-to-end inversion”. In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/yin2022ML4SEISMICutc/index.html>.
- “Simulation-based framework for geological carbon storage monitoring”. In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/yin2022ML4SEISMICsfg/index.html>.
- “Amortized velocity continuation with Fourier neural operators”. In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/yin2022ML4SEISMICavc/index.html>.
- “Time-lapse seismic survey design by maximizing the spectral gap” (*contributed*). In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/zhang2022ML4SEISMICtss/index.html>.
- “Effective scaling of numerical surrogates via domain-decomposed Fourier neural operators” (*contributed*). In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/grady2022ML4SEISMICesn/index.html>.
- “ML4Seismic open-source software: updates and developments” (*contributed*). In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/louboutin2022ML4SEISMICmos/index.html>.
- “De-risking GCS projects with explainable CO2 leakage detection in time-lapse seismic images” (*contributed*). In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/erdinc2022ML4SEISMICdgp/index.html>.
- “Monitoring with sequential Bayesian inference” (*contributed*). In: *ML4Seismic Partners Meeting 2022*. Nov 2022. URL: <https://slim.gatech.edu/Publications/Public/Conferences/ML4SEISMIC/2022/yu2022ML4SEISMICmsb/index.html>.
- “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>.
- “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.