

ZIYI (FRANCIS) YIN

Email: ziyi.yin@gatech.edu
Personal website: ziyiyin97.github.io

Last update: Sep 2022

EDUCATION

| | |
|--|-----------------------------------|
| Georgia Institute of Technology <i>Doctor of Philosophy in Computational Science and Engineering</i> Advisor: Prof. Felix J. Herrmann Group: Seismic Laboratory for Imaging and Modeling | Atlanta, GA Aug 2019 - Present |
| Emory University <i>Bachelor of Science in Mathematics and Computer Science</i> 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)

WORK EXPERIENCE

| | |
|--|--------------------------------------|
| Georgia Institute of Technology <i>Graduate Research Assistant</i> | Atlanta, GA Aug 2019 - Present |
| Pactera <i>AI intern</i> | Dalian, China May 2019 - Aug 2019 |
| Emory University <i>Undergraduate Honors Research</i> | Atlanta, GA May 2018 - May 2019 |

TEACHING EXPERIENCE

| | |
|--|--|
| Georgia Institute of Technology Graduate Teaching Assistant for Seismic Monitoring CO2 Storage Head Graduate Teaching Assistant for Computational Data Analysis Graduate Teaching Assistant for Exploration Seismology Graduate Teaching Assistant for Iterative Methods for Systems of Equations | Atlanta, GA Spring 2022 Fall 2021 Spring 2021 Fall 2020 |
| Emory University EPASS Peer Tutor for Probability and Statistics I & II EPASS Peer Tutor for Foundation of Mathematics | Atlanta, GA Fall 2018, Spring 2019 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 <i>President</i> <i>Secretary</i> | Atlanta, GA Oct 2020 - Sep 2022 Nov 2019 - Oct 2020 |
| Office of Undergraduate Studies, Emory University <i>Academic Fellow</i> | Atlanta, GA 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”. Oct 2022. Just accepted in: *the January 2023 special section in seismic resolution in The Leading Edge*. URL: <https://slim.gatech.edu/content/de-risking-geological-carbon-storage-high-resolution-time-lapse-seismic-explainable-leakage>.

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*. URL: <https://slim.gatech.edu/Publications/Public/Conferences/AAAI/2022/erdinc2022AAAIdec/erdinc2022AAAIdec.pdf>.
- **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

- “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.