

Ziyi Xi

Computational Seismology, Full Waveform Inversion, High Performance Computing, and Heterogeneous Computing

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Education

- 2018 – present **Ph.D.** student in Computational Science (**Mentor: Prof. Min Chen**)
Michigan State University, East Lansing, MI, USA
- 2015 – 2018 **B.E.** in Computer Science (dual) (**Mentor: Prof. Guangzhong Sun**)
University of Science and Technology of China, Hefei, China
Thesis: An implementation of the parallel simulated annealing algorithm and its application on optimization problems
- 2014 – 2018 **B.S.** in Geophysics (**Mentor: Prof. Daoyuan Sun**)
Member of the Zhao Jiuzhang Talent Program in Earth and Space Sciences
University of Science and Technology of China, Hefei, China
Thesis: Refactoring and optimization of the package FK for seismic waveform calculation

Employment

- 2018 – present **Graduate Research Assistant**
Michigan State University
- 2017 **Teaching Assistant of theoretical mechanics (level A)**
University of Science and Technology of China
- 2017 **Summer Research Intern in geophysics**
University of California, Los Angeles
- 2016 **Teaching Assistant of Electromagnetism (level A)**
University of Science and Technology of China

Awards & Honors

- 2019 Conference Travel Funding awarded by MSU CMSE Graduate Studies Committee
- 2018 Ginther Graduate fellowship, Michigan State University, USA
- 2017 Outstanding Student Scholarship (First Class), University of Science and Technology of China, China
- 2016 College physics innovation research experiment competition (Excellence Award)
- 2016 Support from the National basic subject talent training plan, Ministry of Education, China
- 2016 Zhao Jiuzhang Scholarship, University of Science and Technology of China, China
- 2015 Zhao Jiuzhang Scholarship, University of Science and Technology of China, China

Professional Societies & Activities

- 2020 – present Member of the Seismological Society of America (SSA)
- 2019 – present Member of the American Geophysical Union (AGU)
- 2020 Student Host of the visit from Prof. Zachary E. Ross in Caltech
- 2020 Talk on the Eastern Session of the Seismological Society of America
- 2019 Poster presentation in the AGU fall meeting
- 2019 Talk on the UMich-MSU joint earth science workshop
- 2019 Poster presentation in the Gordon Research Conference, South Hadley, US
- 2019 Participate in the Munich Earth Science School, Munich, Germany

Peer-reviewed Publications

*corresponding author, #co-first author.

Papers in Preparation

1. **Xi, Z.***, Chen, M., Zhou, T., Wang, B., Kim, Y. Full waveform inversion of the crust and upper mantle beneath the East Asia Continent and Western Pacific Subduction Zone.
2. Chen, M.*, **Xi, Z.**, Grima, A. Existence of a low-viscosity layer beneath the 660-km discontinuity based on the orphan slabs imaged beneath East Asia.
3. Li, J.*, Chen, M., Ning, J., Zhou T., **Xi, Z.**, Li, G. Fast Trip: A fast MPI-accelerated 1-D triplication waveform inversion package for constraining the mantle discontinuities.

Papers Submitted

1. Zhou, T.*, **Xi, Z.**, Chen, M., Li, J. Initial model assessment for intermediate-period full-waveform inversion of the contiguous U.S. and surrounding regions (Submitted to Geophys. J. Int.).

Models

1. East Asia Radial Anisotropy Model 2020 (EARA2020)
A 3D radial anisotropy Earth velocity model of East Asia and Western Pacific Slabs. The product is to be submitted to the Incorporated Research Institutions for Seismology, EarthModels (IRIS-EMC).

Open Source softwares

1. pyfk (see <https://github.com/ziyixi/pyfk>)
Pyfk is the python version of FK used to calculate the Green's function and the synthetic waveforms for the 1D Earth model.

Meeting Abstracts

1. **Xi, Z.**, Chen, M., Zhou, T., Wang, B., Kim, Y. (2020) Slab Thinning Controls the Distribution of Large Deep Intraslab Earthquakes in the Western Pacific Subduction Zones. #T018-0021 virtually presented at 2020 AGU Fall Meeting.
2. Chen, M., **Xi, Z.**, Kiser, E., Kehoe, H. (2020) Slab morphology at the source region of the 2015 Mw 7.9 Bonin earthquake imaged by full waveform inversion. #S035-0011 virtually presented at 2020 AGU Fall Meeting.
3. Li, J., Chen, M., Zhou, T., **Xi, Z.**(2020) Double-difference adjoint tomography of the Cascadia subduction zone. #S063-0011 virtually presented at 2020 AGU Fall Meeting.
4. Zhou, T., Chen, M., **Xi, Z.**(2020) Lithospheric structure of the North American Craton constrained by full waveform inversion. #T034-0010 virtually presented at 2020 AGU Fall Meeting.
5. **Xi, Z.**, Chen, M., Zhou, T., Wang, B., Kim, Y. (2019) Towards a Refined 3D Model of the Western Pacific Slab to Investigate the Nature of Deep Earthquakes. #T21F-0384 presented at 2019 AGU Fall Meeting.
6. Zhou, T., **Xi, Z.**, Chen, M. (2019) Full waveform inversion of the crust and upper mantle model beneath the contiguous US. #S23A-07 presented at 2019 AGU Fall Meeting.
7. Chen, M., **Xi, Z.**(2019) Short-period Full Waveform Modeling of the Spatial Relationships of Fine Slab Structure and Deep Earthquakes beneath Japan and Izu-Bonin. #S13C-0440 presented at 2019 AGU Fall Meeting.
8. Chen, M., Zhou, T., **Xi, Z.**(2019) Validation of Seismic Crustal and Mantle Models of the Contiguous U.S. Presented at 2019 SSA Annual Meeting.

Expertise & Skills

Languages	Mandarin Chinese, English.
Computer Skills	<p>Frontend (HTML, CSS, Javascript, Vue.js, React.js, Electron, QT, Wechat mini program development)</p> <p>Backend (Python, Flask, Reactive API development)</p> <p>GPU computing (CUDA C/C++/Python/Julia, Nvidia CUDA packages like cuBLAS and cuSOLVER, multiple GPU communication (NCCL))</p> <p>Scientific computing (Cython, MPI, CUDA, Julia, Fortran, Python)</p> <p>Machine Learning (classical methods, Tensorflow, Pytorch, Taken classes in deep learning)</p> <p>Supercomputing (Linux system management, familiar with Slurm and parallel computing)</p>
Music	Cucurbit flute (Chinese traditional instrument) (Skilled); Guitar (Entry-level); Piano (Entry-level)
Driving	Michigan Driver's License