Hongyu Xiao

Ph.D. | The University of Oklahoma | Email: Hongyu.Xiao-1@ou.edu

Education

Ph.D. in Geophysics/Geology, University of Illinois Urbana-Champaign, 2023 Advisor: Dr. Xiaodong Song

M.S in Geophysics/Physics, University of Chicago, 2016 Advisor: Dr. Douglas MacAyeal

B.E.S in Geological Engineering, China University of Petroleum, Beijing, 2014, **Honor Program**, Top Graduates

Professional Experience

Research Associate, University of Oklahoma, Oklahoma Geological Survey **2024 - now.**

- Designed AI/ML algorithms for real-time CCS (Carbon Capture and Storage) monitoring and research.
- Integrated AI/ML algorithms with nodal systems and microseismic arrays using PyTorch

Research Assistant, University of Illinois Urbana-Champaign, Department of Geology **2017 - 2023**

- Built a high-resolution joint inversion seismic tomography model of the midcontinent of the United States with revised receiver functions and ambient noise surface wave data.
- Applied a revised receiver function analysis in central and north midcontinent of U.S. and constructed high-resolution Moho depth maps.

Research Assistant, University of Chicago, Department of the Geophysical Sciences **2015 - 2016**

- Built a 3-layer neural network model of early earthquake warning system based on historical seismicity records.

Graduate Student Intern, Prairie Research Institute, the Illinois Geological Survey **2022**

- Conducted diverse geophysical surveys such as seismic streamers, electrical conductivity surveys, and Horizontal-to-Vertical Spectral Ratio (HVSR)
- Developed a Raspberry Shake based HVSR tool for horizontal-to-vertical spectral ratio (HVSR) and depth-to-bedrock analysis in Illinois.

Projects

Department of Energy (DOE) - Oklahoma Geological Survey coordination of mid-continent carbon management

Lead PI: Dr. Nicholas Hayman, The University of Oklahoma **2024- 2026**

Publications

- Xiao, Hongyu, et al. "Crustal Thickness Variations in the Central Midcontinent, USA, and Their Tectonic Implications: New Constraints Obtained Using the H-κ-c Method." *Geophysical Research Letters* 49.17 (2022): e2022GL099257.
- Xiao, H., Marshak, S., DeLucia, M., & Song, X. (2025). Moho depth (crustal thickness) variations under the northeastern midcontinent of North America, based on H-κ−c receiver-function analysis. *Earth and Planetary Science Letters*, 658, 119289.
- (In prep) Xiao, Hongyu, et al., " Joint Inversion of Surface Wave Dispersions and Receiver Functions in The Central Midcontinent of The United States: Implications for the Central Midcontinent of the USA "

- (In prep) Xiao, Hongyu, et al., " Crustal Thickness Variations Across North American Cratonic Basins: New Constraints from the Williston, Illinois, and Michigan Basins Using Receiver-Function Analysis. "
- (In prep) Xiao, Hongyu, et al., "Benchmarking Transfer Learning for Enhanced Detection and Monitoring of Induced Earthquakes from Regional and Microseismic Arrays "
- (In prep) Xiao, Hongyu, et al., "Boosting Microseismic Detection: Hyperparameter Optimization in Transfer Learning for Induced Earthquake Monitoring "

Teaching Experience

Teaching Assistant, University of Illinois Urbana-Champaign, Geology Department **2017- 2023**

Lab teaching instructor for multiple undergraduate level courses:

- Planet Earth / Physical Geology / Mineralogy and Mineral Optics / Structural Geology and Tectonic

Program instructor, University of Chicago **2016- 2017**

- Design and deliver STEM courses with Argonne National Laboratory incorporating cutting-edge research and hands-on learning experiences to under-privileged students.
- Developed and maintained strong partnerships with key stakeholders in the community, including schools, government agencies, and industry leaders, to ensure that our programs remained relevant and impactful.

Presentations and Talks

- (**Invited**) Title: What Lies Beneath: Moho Depth and Crustal Structures in the Central Midcontinent, USA
  Hongyu Xiao
  Pigott Colloquium, School of Geosciences, University of Oklahoma, Norman, USA - 2025

- Title: Benchmarking Transfer Learning for Enhanced Detection and Monitoring of Induced Earthquakes from Regional and Microseismic Arrays
  Hongyu Xiao, Jacob Walter, Paul Ogwari
  AGU Fall Meeting 2024, Washington DC, USA -2024

- (**Invited**) Title: Continental-Interior Deformation Deeper Down: Hints of Crustal Buckling and Trans-Crustal Shear Zones in the Cratonic Platform, Midcontinent USA
  Stephen Marshak**, Hongyu Xiao,** Benjamin Murphy**,** Michael DeLucia**,** Xiaodong Song
  GSA Annual Meeting in Pittsburgh, Pennsylvania, USA – 2023

- Title: The Varying Crustal Thickness Underneath the Cratonic Basins in the Midcontinent of USA and its Implications: New Insights Using the H-κ-c Method
  H Xiao, MS DeLucia, X Song, S Marshak
  AGU Fall Meeting 2022

- Title: Surface Wave Tomography from Ambient Noise in Central U.S. and its Implications for Illinois Basin and New Madrid Seismic Zone
  H Xiao, X Song, S Marshak
  GSA Annual Meeting in Indianapolis, Indiana, USA - 2018

Professional Service

Student Representative, UIUC Department of Geology Climate Working Group, 2021-2022
Vice President, UIUC Department of Geology Graduate Student Council, 2020-2021

Honors and Awards

Poser Award, DISC Data Science Symposium, OU, 2025
Best Poster Award, The University of Oklahoma Sustainability Forum, OU, 2025

Teachers Ranked as Excellent by Their Students, UIUC, 2022
Five Times Best Photo Awards, SESE Research Review, UIUC, 2021
Teachers Ranked as Excellent by Their Students, UIUC, 2021
Jackson Graduate Research Awards, UIUC, 2020
Teachers Ranked as Excellent by Their Students, UIUC, 2019