

Natasha Toghramadjian

Postdoctoral Fellow, Harvard University

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Research Summary

Structural geologist and applied geophysicist specializing in 3D structural modeling, data analysis, and seismic waveform processing. In my research I integrate large, independent geological and geophysical datasets and diverse methods to model complex fault systems and other structures, with applications in 3D subsurface characterization and seismic hazard assessment.

Education & Research Experience

- Sept 2018–May 2025 **PhD in Structural Geology & Applied Geophysics, Harvard University, Cambridge, MA**
- Developed 3D CAD models of crustal fault systems in southern California integrating large, diverse geological and geophysical datasets.
 - Applied ambient noise seismology to characterize velocity structure and ground motion amplification in the Seattle basin.
 - Ambient noise tomography imaging of subsurface features toward geothermal development in Armenia.
 - Funded by NSF Graduate Research Fellowship.
- Sept 2017–June 2018 **U.S. Fulbright Research Fellow, Yerevan, Armenia**
- Statistical analysis of reservoir-triggered seismicity using cellular seismology.
 - Field deployment and maintenance of regional seismic monitoring networks.
- Sept 2013–May 2017 **B.S. Geological Sciences, Minor in Physics, Boston College, Chestnut Hill, MA**
- Honors Senior Thesis in Geophysics; President, Geology Association; Sigma Pi Sigma Physics Honor Society.

Awards & Fellowships

- 2019–2024 NSF Graduate Research Fellowship
- 2017–2018 U.S. Fulbright Research Fellowship
- 2018 *Theodore H. Ashford Fellowship in the Sciences*, Harvard University
- 2023 Best Overall Presentation, SCEC Annual Meeting
- 2020 DS4A Women's Summit Fellow; Best Presentation Award

Skills

Technical GOCAD (3D CAD modeling), python, GIS, structural interpretation, seismic reflection data interpretation, StructureSolver, MOVE, data science & ML analysis, seismometer deployment & servicing, seismic waveform processing and analysis, geologic field mapping.

Selected Publications

1. **Toghramadjian, N.** & Shaw, J. H. *Anatomy of a complex strike-slip urban fault system: the Newport–Inglewood fault, Los Angeles, California*. Manuscript in preparation.
2. **Toghramadjian, N.**, Denolle, M. A., Ermert, L., & Jiang, C. *Probing the Seattle Basin edge using a dense urban nodal array in 100 backyards*. *Seismological Research Letters* (2026).
3. Meliksetian, K., Sargsyan, L., Koulakov, I., **Toghramadjian, N.**, et al. *Deep sources of recent volcanism in Armenia inferred from ambient noise tomography*. *Journal of Geophysical Research: Solid Earth* (2026).
4. **Toghramadjian, N.** & Shaw, J. H. *3D Geometry and Slip Distribution in the Long Beach Earthquake Gate, Newport–Inglewood Fault*. *Bulletin of the Seismological Society of America* 114(4):1941–1965 (2024).

5. Sargsyan, L., **Toghramadjian, N.** & Kafka, A. *Cellular Seismology Analysis of Reservoir-Triggered Seismicity Associated with Armenian Dams*. Bull. Seismol. Soc. Am. (2018).

Selected Field Experiments

- **Seattle Basin Edge Experiment, 2019**: Co-led deployment of 100 nodal and 20 broadband seismometers across Seattle basin edge and fault zone to study velocity structure and ground motion amplification.
- **Caucasus Seismic Transect Array, 2017-2018**: Installed and maintained network of 30+ broadband seismometers across Armenia and Georgia; funded by grants from the U.S Fulbright Program and NSF.

Teaching & Mentorship

- Head Teaching Fellow, EPSESE109 – Earth Resources & the Environment, Harvard School of Engineering Applied Sciences (Spring 2025)
- Teaching Fellow, GENED1085 – Energy Resources & the Environment, Harvard College (Spring 2022)
- Research advisor for undergraduate and graduate students in structural geology and geophysics, Dept. of Earth & Planetary Sciences, Harvard University (2019-present).

Professional Activities

- Subject Matter Expert for Earthquake Response, SAGE Program, U.S. Dept. of Homeland Security (2024–present)
- Co-founder & President, Harvard–MIT Society of Catholic Scientists