NATASHA TOGHRAMADJIAN

PhD Candidate in Geophysics and NSF Graduate Research Fellow

natasha_toghramadjian@g.harvard.edu github.com/ntoghrama ORCID 0000-0003-4436-6058
ntoghrama.github.io/ 20 Oxford Street, Cambridge, MA 02138

EDUCATION & EXPERIENCE

Harvard University
Department of Earth & Planetary Sciences

PhD Candidate and NSF Graduate Research Fellow

Sept 2018 – present Cambridge, MA

- Research into earthquake source characterization, 3D CAD modeling of crustal structures, geophysical and geological data analysis, and seismic hazard in Los Angeles, advised by Prof. John H. Shaw
- Collaboration with Prof. Marine A. Denolle (UW), applying ambient noise seismology and high-performance computing to investigate the Seattle basin and fault zone
- Independent researcher/analyst on international US-Armenia collaborative research grant into geothermal energy potential in the Armenian Caucasus mountains:
  U.S. Agency for International Development (USAID) Partnerships for Enhanced Engagement in Research (PEER) Project Grant 9-252 (2021-2023): *Assessment of geothermal energy resources and natural hazards in Armenia*

U.S. Fulbright Research Fellow

Seismology without Borders: Geological Rifts and Political Shifts in the Caucasus

Sept 2017 – June 2018 Yerevan, Armenia

Geophysics researcher on NSF-funded "Transect Project"

- International field work servicing seismic stations
- Manually collected and logged decades of analog seismic bulletins; relocated events with improved precision using HYPO71
- Cellular Seismology analysis of reservoir-triggered seismicity
- Interviewed key international figures to explore the project's capacity to transcend regional conflicts

Boston College
Arts & Sciences Honors Program

B.S. in Geological Sciences, Minor in Physics

Sept 2013 – May 2017 Chestnut Hill, MA

- Honors Senior Thesis in Geophysics
- Independent Research in Geophysics
- *South Dakota School of Mines & Technology, 2016:*
  Intensive 5-week field course in the Black Hills
- President, Boston College Geology Association
- Sigma Pi Sigma Physics Honors Society
- Dean's List, 1st Honors

PUBLICATIONS

1. Sargsyan L.S., Meliksetian Kh.B., Metaxian J-P., Levonyan A.F., Grigoryan E.S., **Toghramadjian N.**, Navasardyan G.Kh., Manucharyan D.A., Gevorgyan M.R., and Harutjunyan K.A.; Volcano-Tectonic Seismicity in Continental Collision Zones: Earthquake Swarms in the Gegham Volcanic Ridge (Armenia). Proceedings NAS RA, Earth Sciences, 2021, v. 74, N 1, 3-19
2. Lilit Sargsyan, **Natasha E. Toghramadjian**, Alan L. Kafka; Cellular Seismology Analysis of Reservoir-Triggered Seismicity Associated with Armenian Dams. Bulletin of the Seismological Society of America; 108 (5B): 3126–3140. doi: [https://doi.org/10.1785/0120180014]

AWARDS & FELLOWSHIPS

- **NSF Graduate Research Fellowship** (2019)
- **Theodore H. Ashford Fellowship in the Sciences** (2018)
  Awarded to six Harvard graduate students most likely to make a substantial impact in their field of study and in society
- **U.S. Fulbright Research Fellowship** (2017-2018)
- **Thomas M. Brennan Memorial Scholar** (2013-2017)
- **L. Austin Weeks Undergraduate Field Study Grant** (2016)
- **Boston College Advanced Study Grant** (2014)
  For summer research on the Jemez Pueblo of New Mexico
- **Data Science (DS4A) Women's Summit Fellow** (2020)
  Awarded Best Presentation

TEACHING

- **Energy Resources & the Environment: General Education 1085, Harvard University** Teaching Fellow, Spring 2022
- Research mentor for undergraduate senior thesis in geophysics: EPS91R, Independent Reading & Research in Geophysics, Harvard University, Spring 2021
- **Earth Sciences January Term, Harvard University, January 2021:**
  Designed and led a month-long research course
  teaching undergraduate students how to gather and analyze geological data

RESEARCH PRESENTATIONS

- *The Signal Hill Restraining Bend: The Influence of Fault Segmentation on Earthquake Magnitudes for the Newport-Inglewood Fault, Los Angeles, CA.* Oral presentation, AGU Fall Meeting, New Orleans, Dec. 17, 2021
- *3D geometry and kinematics of the restraining bend at Signal Hill: implications for seismic hazard for the Newport-Inglewood fault, Los Angeles, CA.* Poster, SCEC Annual Meeting, Virtual, Sept. 2021
- *A tale of urban seismology: Ambient seismic noise, machine learning methods, and seismic hazard analysis at the Seattle basin edge.* Poster, SCEC Annual Meeting, Virtual, Sept. 2021
- *New Perspectives on Newport-Inglewood Fault Geometry.* Oral presentation, SSA Annual Meeting, Virtual, Apr. 23, 2021
- *New Perspectives on Newport-Inglewood Fault Geometry.* Poster, SCEC Annual Meeting, Virtual, Sept. 2020
- *Virtual Propagation of Seismic Waves in the Seattle Basin.* Poster, AGU Fall Meeting, San Francisco, CA, Dec. 2021
- **Invited talk:** *Investigating the Seattle basin and fault zone through ambient noise cross-correlation: Ground motion amplification and wavefield behavior.* Pacific Northwest Earthquake Science Week, Seattle, WA, Nov. 5, 2019
- **Invited seminar:** *Preliminary cross-correlation results for the Seattle area.* Earth and Space Sciences Department, University of Washington, Seattle, WA, Aug. 13, 2019
- **Invited lecture:** *Cellular Seismology as a Tool for Exploring Natural and Human-Induced Patterns of Seismicity.* Weston Observatory Public Colloquium Lecture Series, Weston, MA, May 15, 2019
- *Characterizing Strong Shaking Hazard in Seattle Using Ambient Noise Seismology.* Oral presentation, SSA Annual Meeting, Seattle, WA, Apr. 24, 2019
- *Cellular Seismology Analysis of Reservoir-Triggered Seismicity Associated with Armenian Dams.* "30 Years After the Spitak Earthquake" Conference, Yerevan, Armenia, Dec. 7, 2018
- *Cellular Seismology Analysis of the Caucasus Continental Collision.* Oral presentation of Honors Thesis in Geophysics, Department of Earth and Environmental Sciences Student Colloquium, Boston College, May 5, 2017
- *Oklahoma Has Become Earthquake Country!* Independent Research in Geophysics (Department of Earth and Environmental Sciences Student Colloquium, Boston College, May 6, 2016)
- *Earth Sciences and Native American Pueblo Culture*, Boston College Undergraduate Research Symposium (Jan. 30, 2015)

SELECTED FIELD EXPERIMENTS

- **August 2019, Seattle, WA:** Shifting broadband seismometers from the Seattle basin to bedrock reference sites, for comparative study of ground motion amplification levels.
- **July 2019, Seattle, WA:** Co-PI on IRIS PASSCAL Experiment No. 201912, *Seattle Basin Edge*. Led the deployment of 100 PASSCAL nodal seismometers in multiple profiles across the Seattle Fault Zone. All seismometers are hosted in homeowner backyards, and residents are invited to observe the deployment and ask questions. Completed nodal training at PASSCAL in Socorro, NM in May 2019; taught 10 PNSN and UW scientists and students how to deploy nodal seismometers.
- **April 2019, Seattle, WA:** Co-PI on urban deployment of 10 broadbands across the Seattle basin, sited at schools, churches, and small businesses. Installed an educational exhibit at each seismic station, and coordinated local student participation during deployment.
- **2017-2018, Caucasus Mountains:** International field work with the NSF-funded Transect Project, during U.S. Fulbright Research Grant:
  - **Instrumentation and geological field work:** Helped deploy, service, and winterize 30+ broadband seismometers across the Caucasus mountainbelt, in Armenia and Georgia.
  - **Archival field work:** Manually collected and logged decades of analog seismic bulletins from seismological institutes of Yerevan and Gyumri, Armenia; relocated seismic events with improved precision using HYPO71.
  - **Qualitative field work:** Interviewed key international players to explore the project's capacity to transcend regional conflicts; Yerevan, Armenia, and Tbilisi, Georgia.
- **July-August 2015, Guatemala:** As a summer intern with the National Institute of Seismology & Volcanology of Guatemala, assisted in installing seismo-volcanic monitoring system in the villages of Volcán de Pacaya, and collected ash samples from pyroclastic ravines formed by recent eruptions on Volcán de Fuego.
- **June-August 2014, Jemez Pueblo, New Mexico:** As a summer intern with the Natural Resources Department of Jemez Pueblo, sampled Jemez River water and sediments, wrote water sampling field manual, and performed air quality tests in the Valles Caldera.

EXTRACURRICULAR ACTIVITIES & OUTREACH

- *St. Albert Initiative* (2021, 2022): Gave invited talk and poster presentations, on the Jesuit history of seismology and the pressing questions on the forefront of earthquake science today, to high school students and teachers. Mundelein Seminary, IL, Feb. 5, 2022; Catholic University of America, Washington D.C., Nov. 5 2021.
- **Invited talk:** *Earthquakes, their Consequences, and the Jesuit Pioneers of Seismology.* Society of Catholic Scientists Annual Meeting, Washington D.C., June 5, 2021
- **NCRC Graduate Student Panelist, Jan. 2021**
- **Science Club for Girls, Volunteer Mentor Scientist**
  Team-teach weekly science lessons to 20+ girls in Boston public schools (2013, 2015, 2018, 2019)
- **Science Olympiad Academic Mentor and Coach**
  Cambridge Rindge and Latin High School (Spring 2019)
- **Urartu Armenian Women's Choir**, Soprano vocalist (2018–present)
- **Boston College Symphony Orchestra**, Violinist (2014-2015)

LANGUAGES

python | julia | Armenian | German | Spanish