

Liam Toney

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EDUCATION

University of Alaska Fairbanks (UAF) | *Fairbanks, AK* | May 2023 (expected)
Ph.D. in Geophysics

Pomona College | *Claremont, CA* | December 2017
B.A. *cum laude* in Physics; minor in Geology

School for International Training | *Jaipur, Rajasthan, India* | August 2015–December 2015
Sustainable Development and Social Change program

RESEARCH EXPERIENCE

UAF Geophysical Institute (GI) | *Fairbanks, AK* | August 2018–present
Graduate Research Assistant

U.S. Geological Survey Geologic Hazards Science Center | *Golden, CO* | June 2020–December 2022
Student Trainee (Physical Science), Landslide Hazards Program

GNS Science | *Waikato, New Zealand* | April 2018–May 2018
Ashfall Geovisualization Developer

Sandia National Laboratories (SNL) | *Albuquerque, NM* | June 2017–August 2017
R&D Intern, Geophysics Department

Incorporated Research Institutions for Seismology (IRIS) | *Albuquerque, NM* | June 2016–August 2016
Summer REU Intern (placement at SNL as part of the IRIS Undergraduate Internship Program)

TEACHING EXPERIENCE

Remote Online Sessions for Emerging Seismologists (ROSES) Summer School | *online* | Summer 2021
Co-organizer & Instructor

GEOS 431/631 — Foundations of Geophysics | *UAF* | Fall 2020
Teaching Assistant

GEOS 436/636 — Programming and Automation for Geoscientists | *UAF* | Fall 2020
Teaching Assistant

ROSES Summer School | *online* | Summer 2020
Instructor

Breakthrough Collaborative | *Birmingham, AL* | Summer 2015
Teaching Fellow

Physics Department | *Pomona College* | January 2014–May 2016
Teaching Assistant

PUBLICATIONS

8. **Toney, L.**, Fee, D., Witsil, A., & Matoza, R. S. (2022). Waveform features strongly control subcrater classification performance for a large, labeled volcano infrasound dataset. *The Seismic Record*, 2(3), 167–175. doi.org/10.1785/0320220019
7. Matoza, R. S., Fee, D., Assink, J. D., Iezzi, A. M., Green, D. N., Kim, K., **Toney, L.**, [...], & Wilson, D. C. (2022). Atmospheric waves and global seismoacoustic observations of the January 2022 Hunga eruption, Tonga. *Science*, 377(6601), 95–100. doi.org/10.1126/science.abo7063
6. Watson, L. M., Iezzi, A. M., **Toney, L.**, Maher, S. P., Fee, D., McKee, K., Ortiz, H. D., Matoza, R. S., Gestrich, J. E., Bishop, J. W., Witsil, A., Anderson, J. F., & Johnson, J. B. (2022). Volcano infrasound: Progress and future directions. *Bulletin of Volcanology*, 84. doi.org/10.1007/s00445-022-01544-w
5. Dannemann Dugick, F., van der Lee, S., Prieto, G. A., Dybing, S. N., **Toney, L.**, & Cole, H. (2021). ROSES: Remote Online Sessions for Emerging Seismologists. *Seismological Research Letters*, 92(4), 2657–2667. doi.org/10.1785/0220200421
4. **Toney, L.**, & Allstadt, K. E. (2021). lsforce: A Python-based single-force seismic inversion framework for massive landslides. *Seismological Research Letters*, 92(4), 2610–2626. doi.org/10.1785/0220210004
3. **Toney, L.**, Fee, D., Allstadt, K. E., Haney, M., & Matoza, R. S. (2021). Reconstructing the dynamics of the highly similar May 2016 and June 2019 Iliamna Volcano (Alaska) ice–rock avalanches from seismoacoustic data. *Earth Surface Dynamics*, 9(2), 271–293. doi.org/10.5194/esurf-9-271-2021
2. Fee, D., **Toney, L.**, Kim, K., Sanderson, R. W., Iezzi, A. M., Matoza, R. S., De Angelis, S., Jolly, A. D., Lyons, J. J., & Haney, M. (2021). Local explosion detection and infrasound localization by reverse time migration using 3-D finite-difference wave propagation. *Frontiers in Earth Science*, 9. doi.org/10.3389/feart.2021.620813
1. **Toney, L.**, Abbott, R. E., Preston, L. A., Tang, D. G., Finlay, T., & Phillips-Alonge, K. (2019). Joint body- and surface-wave tomography of Yucca Flat, Nevada using a novel seismic source. *Bulletin of the Seismological Society of America*, 109(5), 1922–1934. doi.org/10.1785/0120180322

CONFERENCE PRESENTATIONS

Toney, L., Fee, D., Witsil, A., & Matoza, R. S. (2023). Automatic generation and support vector classification of a large, labeled collection of explosion infrasound waveforms at Yasur Volcano, Vanuatu. Abstract 390 presented at *IAVCEI Scientific Assembly 2023*, Rotorua, New Zealand, 30 January–3 February. (talk)

Toney, L., Fee, D., Schmandt, B., & Bishop, J. W. (2022). Examining the infrasound wavefield recorded by the iMUSH large-N nodal seismic array. Abstract S52E-0098 presented at *2022 AGU Fall Meeting*, Chicago, IL, 12–16 December. (poster)

Toney, L., Fee, D., Allstadt, K. E., Haney, M., & Matoza, R. S. (2022). Seismoacoustic characterization of very large ice–rock avalanches on Iliamna Volcano, Alaska, USA. Presented at *Cities on Volcanoes 11*, Heraklion, Crete, 12–17 June. (invited talk)

Toney, L., Fee, D., Witsil, A., & Matoza, R. S. (2021). Explosion-source classification on a large, labeled collection of volcanic infrasound waveforms using machine learning. Abstract V33D-02 presented at *2021 AGU Fall Meeting*, New Orleans, LA, 13–17 December. (talk)

Allstadt, K. E., Mitchell, A., **Toney, L.**, George, D., & McDougall, S. (2021). Seismic inversions of large, rapid landslides: What they can and cannot tell us about event dynamics. Abstract EGU21-954 presented at *EGU General Assembly 2021*, online, 19–30 April. (invited talk)

Dannemann Dugick, F., van der Lee, S., Prieto, G. A., Dybing, S. N., **Toney, L.**, & Cole, H. (2021). Towards inclusive teaching through online learning: An example from ROSES. Presented at *2021 SSA Annual Meeting*, online, 19–23 April. (invited talk)

Toney, L., Fee, D., & Witsil, A. (2020). An assessment of support vector machines for volcanic infrasound signal classification on local scales. Abstract S001-0012 presented at *2020 AGU Fall Meeting*, online, 1–17 December. (poster)

Fee, D., **Toney, L.**, Matoza, R. S., Sanderson, R. W., Haney, M., Lyons, J. J., Iezzi, A. M., Kim, K., De Angelis, S., Diaz Moreno, A., & Jolly, A. D. (2019). A framework for improved infrasound back-projection on local and regional scales. Abstract S41E-0577 presented at *2019 AGU Fall Meeting*, San Francisco, CA, 9–13 December. (poster)

Toney, L., Fee, D., Allstadt, K. E., Haney, M., & Matoza, R. S. (2019). A tale of two very large avalanches: Probing the limits of seismoacoustic avalanche characterization on Iliamna volcano, Alaska. Abstract S23D-0658 presented at *2019 AGU Fall Meeting*, San Francisco, CA, 9–13 December. (poster)

Toney, L., Fee, D., Haney, M., Matoza, R. S., & Allstadt, K. E. (2019). Seismoacoustic insights from the May 22nd, 2016 Iliamna volcano rock and ice avalanche. Abstract 47 presented at *2019 SSA Annual Meeting*, Seattle, WA, 23–26 April. (poster)

Toney, L., Abbott, R. E., & Preston, L. A. (2017). Joint body-and surface-wave tomography of Yucca Flat, Nevada. Abstract S33A-0854 presented at *2017 AGU Fall Meeting*, New Orleans, LA, 11–15 December. (poster)

Toney, L., Abbott, R. E., Knox, H. A., Preston, L. A., & Hoots, C. R. (2016). Surface-wave tomography of Yucca Flat, Nevada. Abstract S51A-2744 presented at *2016 AGU Fall Meeting*, San Francisco, CA, 12–16 December. (poster)

INVITED TALKS

Sandia National Laboratories Ground-based Nuclear Explosion Monitoring Seminar | March 2022
Theory, implementation, and applications of seismoacoustic backprojection at local and regional scales

Geophysical Society of Alaska Luncheon Series | April 2021
Reconstructing massive avalanches at Iliamna Volcano using seismic and acoustic signals

OPEN SOURCE CODE CONTRIBUTIONS

PyGMT | github.com/GenericMappingTools/pygmt
Contributor

lsforce | code.usgs.gov/ghsc/lhp/lsforce
Co-developer

rtm | github.com/uafgeotools/rtm
Co-developer

infresnel | github.com/liamtoney/infresnel
Developer

sonify | github.com/liamtoney/sonify
Developer

SERVICE

Referee

Earth Surface Dynamics ($n = 1$)

Journal of Geophysical Research: Earth Surface ($n = 1$)

Seismological Research Letters ($n = 1$)

Surveys in Geophysics ($n = 1$)

Student Member | March 2021–February 2023

AGU Seismology Section Executive Committee

President | April 2021–April 2022

GI Graduate Student Association (GIGSA)

Vice President | May 2020–April 2021

GIGSA

Treasurer | April 2019–May 2020

GIGSA

DIVERSITY, EQUITY, & INCLUSION ACTIVITIES

Co-founder & Member | September 2020–present

GI Diversity, Equity, and Inclusion (DEI) Committee

Member | October 2021

UAF Seismology Faculty Search: DEI Evaluation Committee

Participant | Spring 2021

UAF Unlearning Racism in Geoscience Pod

Member | Fall 2020 & Spring 2021

UAF Strategic Plan for Inclusive Excellence: Student Experience/Access to Resources Team

HONORS & AWARDS

Outstanding Student Presentation Award | February 2023

AGU

Outstanding Student Performance Award | April 2021

GI

Brian R. Zelenka Memorial Scholarship | April 2021

Geosciences Department, UAF

Secretary of Energy Achievement Award | January 2021

U.S. Department of Energy (as part of the Source Physics Experiment, Phase II, Dry Alluvium Geology team)

Honorable Mention, John Hunter Excellence in Plotting Contest | July 2020

SciPy

Distinction in the Senior Exercise | December 2017

Physics Department, Pomona College

Tileston Physics Prize | September 2014, September 2015

Physics Department, Pomona College

PROFESSIONAL AFFILIATIONS

International Association of Volcanology and Chemistry of the Earth's Interior | 2022–present

Seismological Society of America | 2019–present

American Geophysical Union | 2016–present

TECHNICAL SKILLS

Coding

- Python (inc. *ObsPy*, *scikit-learn*, *PyGMT*, *Cartopy*, *xarray*, *Rasterio*)
- MATLAB
- R
- Unix
- GMT
- GDAL
- L^AT_EX
- Git
- HTML + CSS

Software

- ArcGIS / QGIS
- Adobe Illustrator + InDesign + Photoshop + Lightroom
- GitHub (inc. Actions) / GitLab (inc. CI/CD pipelines)
- Read the Docs
- Mendeley
- macOS
- Linux
- Windows

FIELDWORK

| Date | Duration | Activity | Location | Role |
|------------------|----------|---|---|-----------|
| July 2022 | 4 days | Infrasound array installation | Barry Arm, Alaska, USA | Assistant |
| June–July 2021 | 3 weeks | Geophysical station installation/maintenance | Akutan/Unalaska/Unimak islands, Alaska, USA | Assistant |
| July–August 2019 | 4 weeks | Seismic and infrasound station installation/maintenance | Adak/Atka/Chuginadak/Umnak islands, Alaska, USA | Assistant |
| April 2018 | 1 day | Volcanic gas flux measurement | Whakaari/White Island, New Zealand | Assistant |
| April 2018 | 2 days | Microgravity survey | Mount Tongariro, New Zealand | Assistant |
| February 2018 | 1 week | Seismic deployment | Southland, New Zealand | Assistant |

| Date | Duration | Activity | Location | Role |
|-------------|-----------------|------------------------------|---|-------------|
| July 2016 | 1 week | Active-source seismic survey | Nevada National Security Site, Nevada, USA | Assistant |