

Shreya Kanakiya Fernandes

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EDUCATION

- 2022 **Ph.D. Geology, University of Auckland**
Thesis title: Geophysical signatures of hydrothermal alteration for volcano monitoring
- 2017 **M.Sc. Geology, University of Auckland**
Thesis title: An experimental study to characterize changes in physical properties of basalts and basanites during reaction with carbonic acid
- 2014 **B. Sc. Geology & Physics, University of Mumbai**
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PROFESSIONAL APPOINTMENTS

- 2024-
Present **Visiting Assistant Professor, Hamilton College**
Geosciences Department (current primary appointment)
- 2024 –
Present **Visiting Scholar, Boston College**
Earth and Environmental Sciences Department
- 2024 -
Present **Research Affiliate, Massachusetts Institute of Technology**
Earth, Atmospheric, and Planetary Sciences (Collaborative Organization for Rock Deformation)
- 2022 -
2023 **Postdoctoral Fellow, University of Houston**
Department of Civil & Environmental Engineering
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RESEARCH FUNDING

Current:

- 2024-2026 NSF - Marine Geology & Geophysics. *Petrophysical constraints on the slip behavior of oceanic transform faults* (In collaboration with Mark Behn & Seth C. Kruckenberg). US \$358,605
- 2024-2025 Williams-Watrous-Couper Fund - Hamilton College Faculty Teacher-Scholar Award. *Understanding solid-earth processes at active volcanoes and fault zones*. US \$5,000

Past:

- 2019 R N Brothers Memorial Award - University of Auckland. *Field work on Mt. Taranaki volcano*. NZ \$4,000
- 2019 Hutton Fund Award - Royal Society of New Zealand. *Determining geophysical signatures of hydrothermal alteration to delineate collapse-prone volcanic flanks*. NZ \$1,000
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PUBLICATIONS

- 2024 **Kanakiya, S.** (2024). Scenario-based volcano slope stability hazard analysis: Case study of Augustine Volcano, Alaska. *Journal of Geophysical Research: Earth Surface*. 129, e2024JF007862. <https://doi.org/10.1029/2024JF007862>
- 2022 **Kanakiya, S.,** Adam, L., Rowe, M. C., Esteban, L., Lerner, G., & Lindsay, J. M. (2022). Petrophysical and elastic properties of altered lavas from Mt. Taranaki: Implications for dome stability. *Journal of Volcanology and Geothermal Research*. 432. <https://doi.org/10.1016/j.jvolgeores.2022.107693>
- 2021 **Kanakiya, S.,** Turner, G. M., Rowe, M. C., Adam, L., & Lindsay, J. M. (2021). High remanent magnetization measured in hydrothermally altered lavas. *Geophysical Research Letters*. 48, e2021GL095732. <https://doi.org/10.1029/2021GL095732>
- 2021 **Kanakiya, S.,** Adam, L., Rowe, M. C., Lindsay, J. M., & Esteban, L. (2021). The role of tuffs in sealing volcanic conduits. *Geophysical Research Letters*. 48, e2021GL095175. <https://doi.org/10.1029/2021GL095175>
- 2017 **Kanakiya, S.,** Adam, L., Esteban, L., Rowe, M. C., & Shane, P. (2017). Dissolution and secondary mineral precipitation in basalts due to reactions with carbonic acid. *Journal of Geophysical Research: Solid Earth*, 122, 4312–4327. <https://doi.org/10.1002/2017JB014019>
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MANUSCRIPTS IN PREPARATION

* *Student mentee*

Kanakiya, S. and *Essenmacher, S. Characterizing spatiotemporal ground deformation at Whakaari (White Island) volcano, New Zealand, using InSAR time-series analysis. In preparation for submission in *Journal of Geophysical Research – Earth Surface*.

Kanakiya, S. & Adam, L. Pressure-induced poroelastic changes in hydrothermally altered volcanic rocks. In preparation for submission in Geophysical Journal International.

Adam, L., **Kanakiya, S.**, Boulton, C., Guerin-Marthe, S., Townend, J., Faulkner, D., & Upton, P. Persistent compliance drives localization of deformation on a major plate boundary fault. In preparation for submission in Geochemistry, Geophysics, Geosystems.

Al-Yaseri, A., Esteban, L., Giwelli, A., Sarout, J., Sarmadivaleh, M., **Kanakiya, S.** & Adam, L. Hydrogen storage in volcanic rock formation: Is it a good option to reach net-zero in Australia?

AWARDS, SCHOLARSHIPS & OTHER GRANTS

2022	Outstanding Ph.D. Thesis Award in Earth Sciences, School of Environment - University of Auckland
2022	Distinguished Graduate Award, University of Auckland
2021	Early Career Scientist's Travel Support Grant, European Geosciences Union (Conference expenses)
2020	Academic Career Exploration Award, University of Auckland
2019	Fall Meeting General Student Travel Grant, American Geophysical Union (USD 1,000)
2019	Young Researcher Travel Grant, Geoscience Society of New Zealand (NZD 1,112)
2019	SEG/Chevron Student Leadership Symposium Travel Grant, Society of Exploration Geophysicists and Chevron (Full funding for international travel & conference expenses)
2018	Jim Ansell Geophysics Scholarship, Geoscience Society of New Zealand (NZD 1,350)
2018	Postgraduate Student Research Award, School of Environment - University of Auckland
2018	Ph.D. Scholarship, New Zealand Earthquake Commission (Full funding for 3.5 years ~ NZD 119,000)

TEACHING EXPERIENCE

Instructor of Record

- Mineralogy | Fall 2024 | Hamilton College
- Principles of Geoscience - Natural Hazards & Society | Spring 2025 | Hamilton College
- Volcano Monitoring | Spring 2025 | Hamilton College

Co-Teaching

- Senior Seminar | 2024 – 2025 | Hamilton College

Teaching Assistant

- Foundation for Earth Sciences | Spring 2019 | University of Auckland
 - Exploration Geophysics | Fall - 2019, 2016, and 2015 | University of Auckland
 - Earth Deformation | Spring 2015 | University of Auckland
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STUDENT ADVISING/ MENTORING EXPERIENCE

- Advisor, Senior Thesis - Stella Essenmacher (Hamilton College), 2024 - Present.
 - Advisor, Research Assistant - Owen Ferguson (Hamilton College), 2025 - Present.
 - Advisor, Independent Study - Violet Cue (Hamilton College), 2025 - Present.
 - Mentor, Mentoring365 - AGU, 2022 – Present.
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INVITED TALKS

2025	Subduction Zones in four Dimensions - SZ4Grads Webinar Series
2024	University of Massachusetts Amherst - Department of Earth, Geographic, and Climate Sciences Guest Lecture Series
2024	Colorado School of Mines - Carl Heiland Lecture
2023	European Geosciences Union (EGU) Geochemistry, Mineralogy, Petrology & Volcanology Division - Early Career Researcher Scientific Campfire
2022	[Conference] EGU General Assembly - Invited speaker for the session on 'Volcanic hydrothermal systems and hydrothermal alteration'
2021	Western Washington University - Geology Department Seminar

MEDIA COVERAGE

2021	Earthquake Commission. (1 December 2021). <i>Hydrothermally altered rocks changing the plumbing of our volcanoes</i> . https://www.eqc.govt.nz/news/hydrothermally-altered-rocks-changing-the-plumbing-of-our-volcanoes
2021	SunLive. (1 December 2021). <i>Whakaari rocks tell volcano story</i> . https://sunlive.co.nz/news/282241-whakaari-rocks-tell-volcano-story.html

CONFERENCE PRESENTATIONS

** student mentee*

- 2025 *Essenmacher, S. and **Kanakiya, S.**, Characterizing spatiotemporal ground deformation at Whakaari (White Island) volcano, New Zealand, using InSAR time-series analysis. To be presented at European Geosciences Union (EGU) General Assembly.
- 2024 Boulton, C., Wright, S. , Adam , L., **Kanakiya, S.**, Sutherland, R., and Seward, A. (2024). Modelling the next Alpine Fault earthquake: Why measurements matter. Keynote presented at Geosciences – Annual conference of the Geoscience Society of New Zealand.
- 2024 Meek, D., Adam, L., Sari, M., Esteban, L., Maney, B., Kager, S., Piccard, M., Francois, A., and **Kanakiya, S.** (2024). The effect of hydrothermal alteration on the geomechanical behaviour of Whakaari volcanic rocks. To be presented at Geosciences – Annual conference of the Geoscience Society of New Zealand.
- 2024 **Kanakiya, S.**, Adam, L., Meek, D., Sarout, J., Esteban, L., Dautriat, J., and Sari, M. (2024). Pressure-induced poroelastic changes in hydrothermally altered volcanic rocks. Rock Deformation Gordon Research Conference.
- 2023 Yaseri, A., Esteban, L., Giwelli, A., Sarout, J., Sarmadivaleh, M., **Kanakiya, S.** & Adam, L. (2023). Potential of Hydrogen Underground Storage in Volcanic Reservoirs of Australia: Is it Worth Looking into? Proceedings of the Australian Hydrogen Research Conference.
- 2022 **Kanakiya, S.**, Adam, L., Rowe, M. C., Turner, G.M., Esteban, L., Lindsay, J. & Lerner, G. A. (2022). Advancing Geophysical Data Interpretation for Volcano Monitoring: Lessons Learnt from Laboratory Analysis of a Suite of Hydrothermally Altered Rocks. American Geophysical Union (AGU) Fall Meeting.
- 2022 **[Invited] Kanakiya, S.**, Adam, L., Rowe, M. C., Lindsay, J. & Esteban, L. (2022). An insight into Whakaari's conduit: How altered tuffs and subsurface pressures can control volcano dynamics. European Geosciences Union (EGU) General Assembly.
- 2021 **Kanakiya, S.**, Adam, L., Rowe, M. C., Turner, G.M., Lindsay, J. & Esteban, L. (2021). Evolution of petrophysical and geophysical properties in hydrothermally active volcanic conduits. American Geophysical Union (AGU) Fall Meeting.

- 2021 Adam, L., **Kanakiya, S.**, Boulton, C., Guerin-Marthe, S., Townend, J., Faulkner, D., & Upton, P. (2021). Persistent compliance drives localization of deformation on a major plate boundary fault. American Geophysical Union (AGU) Fall Meeting.
- 2020 **Kanakiya, S.**, Adam, L., Rowe, M. C., Turner, G.M., & Lindsay, J. (2020). Hydrothermal rock alteration as a possible control on eruption dynamics at Whakaari volcano. Geosciences – Annual conference of the Geoscience Society of New Zealand.
- 2019 **Kanakiya, S.**, Adam, L., Rowe, M. C., Turner, G.M., & Lindsay, J. (2019). Changes in the elastic and magnetic behavior of volcanic rocks due to hydrothermal alteration. American Geophysical Union (AGU) Fall Meeting.
- 2019 **Kanakiya, S.**, Adam, L., Rowe, M. C., Turner, G.M., & Lindsay, J. (2019). Elastic and magnetic properties of hydrothermally altered volcanic rocks. Geosciences – Annual conference of the Geoscience Society of New Zealand.
- 2018 **Kanakiya, S.**, Adam, L., Rowe, M. C., & Lindsay, J. (2018). Geophysical signatures of hydrothermal alteration for evaluating volcanic flank instability. Geosciences – Annual conference of the Geoscience Society of New Zealand.
- 2018 Cronin, S., **Kanakiya, S.**, Brenna, M., Shane, P., Smith, I., Ukstins, I., Horkley, K. (2018). Rangitoto Volcano, Auckland City - A one-shot wonder or a continued volcanic threat? Determining Volcanic Risk in Auckland forum.
- 2017 Adam, L., Guerin-Marthe, S., **Kanakiya, S.**, Boulton, C., Toy, V., & Faulkner, D. (2017). The physical properties of Alpine Fault cataclasites that drive its elastic wave velocities. Geosciences - Annual conference of the Geoscience Society of New Zealand.
- 2016 **Kanakiya, S.**, Adam, L., Rowe, M. C., & Esteban, L. (2016). An experimental study to characterize physical rock property changes during reaction of CO₂ with basalts and basanites of the Auckland Volcanic Field. Geological Society of America (GSA) Annual Meeting.
- 2015 **Kanakiya, S.**, Adam, L., & Rowe, M. C. (2015). An experimental study to characterize physical rock property changes during CO₂ reactions with Auckland Volcanic Field basalts. Geosciences - Annual conference of the Geoscience Society of New Zealand.

OTHER RESEARCH EXPERIENCE

2016 - 2018 **Research Assistant, School of Environment, University of Auckland**

Contributed to multiple projects under the Determining Volcanic risk in Auckland programme and to characterizing samples from the Alpine Fault Deep Fault Drilling Project.

PROFESSIONAL CERTIFICATIONS

2023 Inclusive Mentoring, AGU Mentoring 365 - Chronus

2023 Microcredential in Data Science, University of Houston's Hewlett Packard Enterprise Data Science Institute

2021 Synthetic Aperture Radar: Hazards, University of Alaska Fairbanks (edX)

TECHNICAL SKILLS

Modeling: Experienced in conducting slope stability analysis with limit equilibrium and shear strength reduction methods using Scoops3D & FLAC-Slope software.

Compositional analysis: Experienced in characterizing the mineral and amorphous phase composition as well as major element composition of rocks using various techniques - X-ray diffraction (XRD), X-ray fluorescence (XRF), thin sections, electron microprobe – wavelength dispersive spectroscopy (WDS) , energy dispersive spectroscopy (EDS), and elemental X-ray maps.

Porosity measurements: Experienced in measuring the nitrogen gas connected porosity of rocks under ambient and hydrostatic pressure conditions up to ~50 MPa.

Microstructure characterization: Proficient in processing micro-CT scan images using ImageJ-Fiji software and backscattered electron (BSE) images to characterize pore structure and fracture network of rocks.

Elastic and magnetic properties measurements: Experienced in laboratory measurements and analysis of elastic (P-and S-wave velocities) rock properties in dry and saturated conditions at ambient and effective pressures up to ~ 50 MPa. Experienced in characterizing the magnetic susceptibility and natural remanent magnetization of rocks, including variations in susceptibility with temperatures up to 700°C, and alternating field demagnetization experiments.

Other geological & geophysical analysis: Intermediate experience in core logging, granulometric analysis, seismic data processing, and well log analysis.

Spatial analytics: Intermediate experience with QGIS and processing and analyzing InSAR data.

Programming: Proficient in data analytics and visualization using Python and R. Experience with Git and Version Control, MS Office Suite, and SQL. Elementary experience with high-performance computing. Conceptual knowledge of machine learning acquired through Microcredential in Data Science Certification.

RESEARCH CRUISE & FIELD TRIPS

- R/V ROGER REVELLE, Chain Transform Fault in the Mid-Atlantic – dredging fault zone samples, Upcoming 2025.
- Gore Mountain, NY, USA - led mineralogy course field trip, 2024.
- Mt. Taranaki volcano, New Zealand - sampling lava dome and block and ash flow deposits, 2018.
- Whakaari (White Island) volcano, New Zealand - sampling hydrothermally altered conduit rocks, 2018.

SERVICE TO GEOSCIENCE COMMUNITY

- Editorial Board Member (Topical Editor), Volcanica Journal, 2024-Present.
- Co-Convener & Co-Chair, AGU Fall Meeting 2024 - Session on “Re-discovering Earth’s Mantle Heterogeneities Through Imaging, Modeling, Geochemistry, and Mineral Experiments.”
- Proposal Reviewer: National Science Foundation
- Manuscript Reviewer: Journal of Geophysical Research-Solid Earth, Journal of Volcanology & Geothermal Research, New Zealand Journal of Geology and Geophysics, ACS Earth & Space Chemistry, Meteoritics & Planetary Science
- Conference Paper Reviewer: American Rock Mechanics Association - Rock Mechanics / Geomechanics Symposium
- Member, Society of Exploration Geophysicists (SEG) Research Committee Early Career Subcommittee, 2021-2023.

OTHER SERVICE & PROFESSIONAL ACTIVITIES

- Speaker, Empower Leadership Conference – Center for Student Involvement and Women and Gender Resource Center, University of Houston, 2023.
- Judge, Virginia Junior Academy of Science Research Symposium, 2023.
- Secretary, University of Auckland Geophysics Society -SEG Student Chapter, 2015 & 2019 - 2022.
- Member, University of Auckland Research Committee, 2019.
- Member, University of Auckland Board of Graduate Studies, 2019.
- Member, Teaching Awards Subcommittee, 2018.
- Organizing team member, Exposure-Postgraduate Research Showcase, University of Auckland, 2018.
- Volunteer, Incredible Science Day at Auckland Museum of Transport and Technology and University of Auckland, 2015 & 2019.
- Professional Involvement: Geoscience Society of New Zealand, AGU, EGU, Society of Exploration Geophysicists, SZ4D - Subduction Zones in four Dimensions, Sigma Xi, Women in Earth and Environmental Sciences in Australasia.