

Gustavo A. Béjar López

(Gustavo Bejar)

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Education

Ph.D. Geology (current) – Advisors: Dr. Greg Waite & Dr. Rudiger Escobar-Wolf expected July 2025

Certificate in Natural Hazards and Disaster Risk Reduction

Certificate in Geoinformatics

Michigan Technological University (MI)

B.A. Geology with honors, *summa cum laude*, *Phi Beta Kappa* – Advisor: Dr. Kirsten Nicolaysen May 2020

Whitman College (WA)

Previously at Universidad Yachay Tech (Urcuqui, Ecuador).

Skills

English and Spanish advance/native proficiency

Intermediate proficiency in Italian

Programming tools

MATLAB, Python, and Fundamentals of R and Web Development

Machine Learning in Python

Fieldwork and volcanic monitoring

Scientific Writing Skills

GIS and remote sensing product analysis

QGIS, ArcGIS, SAGA GIS, Irbis (temperature monitoring), Agisoft

Metashape for photogrammetry

Digital Collaboration Tools

Microsoft Office and Teams, Google Apps

Hydrologic Modeling through HEC-RAS and HEC-HMS

Collaborative Research and Field Logistics

Peer-reviewed publications and theses

Bosa, A. R., **Bejar, G.**, Waite, G. P., Mock, J. C., Pineda, A., & Anderson, J. F. (2024). *Dynamics of rain-triggered lahars and destructive power inferred from seismo-acoustic arrays and time-lapse camera correlation at Volcán de Fuego, Guatemala*. *Natural Hazards*, 121, 3431-3472. <https://doi.org/10.1007/s11069-024-06926-1>

Mock, J. C., Johnson, J. B., Pineda, A., **Bejar, G.**, & Roca, A. (2024). *UAV-based quantification of dynamic lahar channel morphology at Volcán de Fuego, Guatemala*. *Remote Sensing*, 15(15), 3713. <https://doi.org/10.3390/rs15153713>

Johnson J. B., Roca A., Pineda, A., Mérida, R., Escobar-Wolf, R., Anderson, J. F., Mock, J., Bosa, A., **Bejar, G.** & Waite, G. P. (2023). *Infrasound detection of approaching lahars*. *Scientific Reports* 13, 6476. <https://doi.org/10.1038/s41598-023-32109-2>

Bejar, G. (2020). *Reconstruction of the magmatic processes and eruption dynamics influencing the 1870-5 CE eruption of Ceboruco Volcans, Mexico*. Bachelor of Arts Honors Thesis. Whitman College. <http://works.whitman.edu/2020086>

Roverato, M., Larrea, P., Casado, I., Mulas, M., **Béjar, G.**, & Bowman, L. (2018). *Characterization of the Cubilche debris avalanche deposit, a controversial case from the northern Andes, Ecuador*. *Journal of Volcanology and Geothermal Research*. <https://doi.org/10.1016/j.jvolgeores.2018.07.006>

Presentations and conference proceedings since 2020 (first authors is the presenter author)

Waite, G. P., & **Bejar, G.** (2024). *Seismically-Derived Ground Tilt from Rainfall-Triggered Lahars at Volcán De Fuego, Guatemala*. American Geophysical Union Fall Meeting 2024. Abstract Number S11F-3451. <https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1598161>

Bejar, G., Waite, G. P., Escobar-Wolf, R., Johnson, J. B., Bosa, A., Roca, A., & Pineda, A. (2024). *Identification of Lahar Signals: A Supervised Learning Model Applied to Monitoring Data of Volcan De Fuego, Guatemala*. Seismological Society of America Annual Meeting 2022 (Invited Student Speaker). <https://seismosoc.secure-platform.com/a/solicitations/35/sessiongallery/836/application/11562>

Roca A., Pineda, A., Johnson, J., Mock, J., **Bejar, G.**, & Waite, G. (2024). *Seismology Versus Infrasound: Which Monitoring Technique Is Better for Detecting Advancing Lahars?* Seismological Society of America Annual Meeting 2024. <https://seismosoc.secure-platform.com/a/gallery/rounds/38/details/11768>

Waite, G., **Bejar G.**, Johnson, J., Escobar-Wolf, R., Roca, A., Mérida, R., Bosa, A., & Pineda, A. (2024). *Seismically-Derived Ground Tilt From Rainfall-Triggered Lahars at Volcán De Fuego, Guatemala*. Seismological Society of America Annual Meeting 2024. <https://seismosoc.secure-platform.com/a/solicitations/35/sessiongallery/835/application/11537>

Bejar, G., Waite, G. P., Escobar-Wolf, R., Bosa, A., Johnson, J., Pineda, A., Roca, A., Mérida, R., & Mock, J. (2024). *A machine learning-based strategy to detect and catalog rain-triggered lahars through geophysical monitoring at Volcan de Fuego, Guatemala*. Cities on Volcanoes 2012. Abstract ID 427. <https://congress.iavceivolcano.org/content/uploads/2024/02/session-407.pdf>

Mock, J., Johnson, J. B., Pineda, A., **Bejar, G.**, Roca, A. (2023). *UAV-Based Quantification of Dynamic Lahar Channel Morphology at Volcán de Fuego, Guatemala*. American Geophysical Union Fall Meeting 2023. Abstract Number NS43B-0557. <https://agu.confex.com/agu/fm23/meetingapp.cgi/Paper/1285240>

Bejar, G., Waite, G. P., Escobar-Wolf, R., Johnson, J. B., Bosa, A., Mock, J., Pineda, A., Roca, A., & Mérida Boogher, E. R. (2022). Characterization of rain-triggered lahars in Volcan de Fuego: cataloging and deployment of an automated detection system. American Geophysical Union Fall Meeting 2022. Abstract Number V32A-07. <https://agu.confex.com/agu/fm22/meetingapp.cgi/Paper/1195433>

Johnson, J., Bosa, A., Pineda, A., Roca, A., Mock, J., Anderson, J., **Bejar, G.**, Waite, G. P., Escobar-Wolf, R. (2022). *Seismo-acoustic Analysis of Secondary Lahar Activity at Fuego Volcano (Guatemala)*. American Geophysical Union Fall Meeting 2022. Abstract Number V25E-0119. <https://agu.confex.com/agu/fm22/meetingapp.cgi/Paper/1162939>

Bejar, G., Waite, G., Escobar-Wolf, R., Bosa, A., Mock, J., Johnson, J., Roca, A., Pineda, A. (2022). *From Satellite to Seismic Waves: An Interdisciplinary Approach to Detect and Catalog Lahars on Volcan de Fuego, Guatemala*. IV Assembly of the Latin American and Caribbean Seismological Commission. Bejar, G. (2022). Avances hacia un sistema automatizado de detección de lahares para el Volcán de Fuego, Guatemala. 2do Congreso Interuniversitario de Gestión de Riesgo de Desastre. <https://www.youtube.com/watch?v=XnQYQybzkAo>

Bejar, G. (2022). *Caracterización de lahares en el Volcán de Fuego y estrategias de monitoreo*. Asociación Latinoamericana de Vulcanología: Investigación Volcánica en Centroamérica y el Caribe. <https://www.youtube.com/watch?v=V1t7S6b3dSU>

Bejar, G., Waite, G., Escobar-Wolf, R., Johnson, J., Bosa, A., Bartel, B., Pineda, A., Roca, A., Mock, J., & Gauvain, S. (2021). *A multidisciplinary approach to modeling lahar generation and propagation in Volcan de Fuego, Guatemala*. AGU Fall Meeting 2021. Abstract Number T35B-0204. <https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/957716>

Bosa, A., Pineda, A., Mock, J., Roca, A., Johnson, J. B., **Bejar, G.**, Waite, G. P., Gauvain, S., & Bartel, B. A. (2021). *Dynamics of rain-triggered lahars inferred from infrasound array and time-lapse camera correlation at Volcán de Fuego, Guatemala*. AGU Fall Meeting 2021. Abstract Number V25D-0150. <https://agu.confex.com/agu/fm21/meetingapp.cgi/Paper/893848>

Arteaga, M. E., **Bejar, G.**, Mandon, C., Sutter, E. M., Piispa, E. J., Muñoz, T. D. R. (2020). Seasonal variations of subsurface humidity around a water storage pool in rural Ecuador assessed with electrical resistivity and ground-penetrating radar. American Geophysical Union Fall Meeting 2020. Abstract Number NS015-08. <https://agu.confex.com/agu/fm20/meetingapp.cgi/Paper/678879>

Bejar, G. (2020). *Lava, domes, and beetles: Probing the magmatic processes leading to the 1870-5 CE eruption of Ceboruco Volcano, Mexico*. University of Washington Undergraduate Symposium. <https://expo.uw.edu/expo/apply/577/proceedings/show?id=91629>

Experience and Appointments

- **Teaching Assistant**
Michigan Technological University
Houghton, MI
 Assisted as co-instructor and lab aide for undergraduate and graduate-level courses: Scientific Communications, Social Dimensions of Natural Hazards, Natural Hazards and Computational Geosciences. Contributed with lectures, student evaluation of course progress, curricular development and lab teaching. Supervised by Dr. Greg Waite (Nat Haz), Dr. Luke Bowman (Sci Comm and Soc Dim of Nat Haz), and Dr. Shiliang Wu (Comp Geos).

Aug 2024 – Present
- **Research and Professional Development Co-Chair**
CONVERSE Emerging Researchers
www.converse-er.org
 Organized and hosted online webinars showcasing graduate students and early career researchers work in volcanology. Managed online presence of the organization through the development of a static website and YouTube channel for outreach. Reference: Dr. Tobias Fischer (The University of New Mexico).

Aug 2024 – Present
- **CONVERSE Scenario Building Institute Participant**
The CONVERSE Catalyst Center at the University of New Mexico
Albuquerque, NM
 Assisted with the development of an eruption scenario for Cotopaxi Volcano (to be used for future trainings). Modeled surface eruption activity focusing on pyroclastic density currents and lahars. Reference: Dr. Tobias Fischer (University of New Mexico) and Dr. Bruce Houghton (University of Hawai'i at Mānoa).

Jul 2023 – Present
- **Research Assistant**
Michigan Technological University
Houghton, MI
 Conducted PhD research focusing on seismic characterization of lahars on Volcán de Fuego, Guatemala. Deployed seismic sensors, rain gauges, and video cameras to monitor lahar activity at around 10 locations around the volcano. Developed machine learning-based automated detectors of lahar activity from seismic data reaching a minimum of 85% accuracy. Acquired skills in hydrologic and hydraulic flow modeling. Supervised by Dr. Greg Waite and Dr. Rudiger Escobar-Wolf.

Jun 2020 – Aug 2024
- **Intern**
National Center for Atmospheric Research
Boulder, CO
 Underwent training on the use of K-band micro rain radar and its visualization products as part of NCAR's Graduate Visitor Bridge Program. The radar was later provided as a loaner to be used in the field at Volcan de Fuego to provide better estimates of rainfall in the region. Supervised by Dr. Scott Landolt and Dr. Anna del Moral Mendez.

Jun 2022 – Jul 2022
- **Department Peer Tutor**
Whitman College
Walla Walla, WA
 Provided learning support to students taking Introductory Geology and Structural Geology classes through hour-long sessions once a week. Identified and addressed the best strategy for learning in each student based on their in-class performance (e.g., reviewing graded tests and homework). Supervised by Dr. Kirsten Nicolaysen.

Sep – Dec 2019
- **Research Assistant**
Whitman College
Walla Walla, WA
 Prepared rock samples to describe petrography and geochemistry of Ceboruco Volcano lavas. Performed analysis of textures and compositions under the scanning electron microscope to estimate the eruption sequence. Used phase equilibrium modeling to describe pre-eruptive conditions. Supervised by Dr. Kirsten Nicolaysen.

Sep – Dec 2019
- **Research Intern**
Colima Intercambio e Investigación en Vulcanología
Colima, Mexico
 Performed thermal monitoring, sampling and field observations at Volcán de Colima. Analyzed thermal and seismic datasets. Built volumetric models of crater deformation using photogrammetry. Assisted with the publication of Colima Activity Bulletin #129 outlining morphologic changes in the crater since the last update. Collected samples at Volcán Ceboruco belonging to its most recent eruption in 1870 CE to develop a thesis project reconstructing the sequence of this event. Supervised by Dr. Nick Varley.

May – Aug 2019
- **Research Assistant**
Universidad Yachay Tech
Urcuqui, Ecuador
 Performed field sampling and characterization of deposits from Imbabura and Cubilche volcanoes. Provided petrographic description of lava samples. Supervised by Dr. Patricia Larrea Marquez.

Oct – Dec 2017

- **Fieldwork Assistant** Jul – Aug 2017
Duke University and Universidad Nacional de Piura
Madre de Dios, Peru
 Sampled sediments for screen washing and chemical analyses. Collected fossils and assisted with their identification. Trip leaders: Dr. Wout Salenbien and Dr. Lauren Gonzales.
- **Teaching Assistant** Oct – Dec 2016
Universidad Yachay Tech
Urcuqui, Ecuador
 Curated new mineral collection and assisted with lab preparation for Introduction to Mineralogy course. Supervised by Dr. Patricia Larrea Marquez.
- **Fieldwork Assistant** Jul – Aug 2016
Duke University and Universidad Nacional de Piura
Madre de Dios, Peru
 Sampled sediments for screen washing and chemical analyses. Collected fossils and assisted with their identification. Assisted during expedition that discovered new primate fossil species in the sub-Andean Amazon. Trip leaders: Dr. Wout Salenbien and Dr. Lauren Gonzales.

Presentations and other activities since 2020

- **Invited Speaker, Oral Presentation** Apr 2024
 Seismological Society of America 2024 Annual Meeting: “Identification of Lahar Signals: A Supervised Learning Model Applied to Monitoring Data of Volcan De Fuego, Guatemala”
 Anchorage, AK
- **Speaker, Oral Presentation** Feb 2024
 Cities on Volcanoes 12: “A machine learning-based strategy to detect and catalog rain-triggered lahars through geophysical monitoring at Volcan de Fuego, Guatemala”
 Antigua Guatemala, Guatemala
- **Speaker, Oral Presentation** May 2022
 2do Congreso Interuniversitario en Gestión de Desastres, Guatemala: “Avances hacia un sistema automatizado de detección de lahares para el Volcán de Fuego, Guatemala”
 Online
- **Speaker, Guest Talk** May 2020
 NCAR Advanced Study Program Research Review Talks: “Lahars: When Volcanoes and Water Meet”
 Online
- **Presenter, Poster Presentation** Dec 2021
 AGU Fall Meeting 2021: “A multidisciplinary approach to modeling lahar generation and propagation in Volcan de Fuego, Guatemala”
 Online
- **Speaker, Oral Presentation** Nov 2021
 I Congreso Internacional de Vulcanología y Gestión de Riesgo
 Online
- **Speaker, Oral Presentation** May 2020
 University of Washington Undergraduate Symposium
 Online

Grants and awards

- **Dean’s Award for Outstanding Scholarship** March 2025
Michigan Technological University
 Awarded for contributions to volcanology and natural hazard research. More information: <https://blogs.mtu.edu/geo/2025/03/08/gustavo-bejar-lopez-honored-as-outstanding-scholarship-recipient/>
- **Level I Grant (\$16,931)** October 2023
National Geographic Society
 Awarded for research on lahar characterization on Volcan de Fuego. More information: <https://explorers.nationalgeographic.org/directory/gustavo-bejar-lopez>

- **Abshire Scholar Award** Fall 2019
Whitman College
Awarded for the conduction of undergraduate research project aiming to reconstruct the 1870 CE eruption of Volcan Ceboruco, Mexico. More information: <https://www.whitman.edu/documents/Offices/Provost/2021/abshire-history-11302021.pdf>
- **Whitman Internship Grant (\$5,000)** Summer 2019
Whitman College
Awarded to participate at an internship in volcano monitoring at CIIV, Mexico and to support undergraduate thesis field work.
- **Academic Distinction** Fall 2018, Spring 2019, and Fall 2019
Whitman College
Awarded to students with GPAs above 3.5/4.0
- **Academic Excellence Scholarship** Spring 2017 and Fall 2017
Universidad Yachay Tech
Awarded to students with semester average above 9.0/10.0

Relevant coursework

Volcanology Michigan Technological University	River and Floodplain Hydraulics Michigan Technological University
Volcano Seismology Michigan Technological University	Social Dimensions of Natural Hazards Michigan Technological University
Advanced Natural Hazards Michigan Technological University	Wilderness First Responder Certification Whitman College
Social Dimensions of Natural Hazards Michigan Technological University	Applied Geophysics Michigan Technological University
Advanced Geoinformatics Michigan Technological University	Igneous and Metamorphic Petrology Universidad Yachay Tech

Courses taught or TA'ed

Scientific Communication (<i>Graduate level</i>) Fall 2024, Michigan Technological University	Rated 4.63/5.00
Natural Hazards (<i>Undergraduate and Graduate levels</i>) Fall 2024, Michigan Technological University	Rated 4.67/5.00
Social Dimensions of Natural Hazards (<i>Graduate level</i>) Spring 2025, Michigan Technological University	Rated 4.85/5.00
Computational Geosciences (<i>Undergraduate level</i>) Spring 2025, Michigan Technological University	Rated 4.25/5.00

Student mentoring

Thesis co-advisor for Dayana Espinoza Celi (exp. graduation July 2025). BSc. in Geology at Yachay Tech University in Ecuador. Modeling lahar hydrology and comparison with geophysical datasets.