Johan T. Gilchrist

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Education

Ph.D. Geophysics, University of British Columbia — Jan., 2017 – Nov., 2021
Thesis: Sediment waves and the gravitational stability of explosive eruption columns and ash clouds

M.Sc. Geophysics, University of British Columbia — Sep. 2015 – Dec., 2016
Thesis: Multiphase flow dynamics of explosive volcanic eruptions (direct transfer to Ph.D.)

B.Sc., Major in Geophysics, University of British Columbia — Sep., 2010 – May, 2014

Publications

1. Biensan, C., Taddeucci, J., Carthy, J., Spina, L., Scarlato, P., Benitez, C., **Gilchrist**, J., et al. (in revision). Multiparametrical study of puffing activity at Mount Etna. *Journal of Volcanology and Geochemical Research.*
2. Rowell, C. R., Jellinek, A. M., & **Gilchrist**, J. T. (2023). Tracking Eruption Column Thermal Evolution and Source Unsteadiness in Ground-Based Thermal Imagery Using Spectral-Clustering. *Geochemistry, Geophysics, Geosystems*, 24(11), e2022GC010845. https://doi.org/10.1029/2022GC010845
3. **Gilchrist**, J. T. et al. (2023). Submarine terraced deposits linked to periodic collapse of caldera-forming eruption columns. *Nature Geoscience.* https://doi.org/10.1038/s41561-023-01160-z
4. Poppe, S., **Gilchrist**, J. T., et al. (2022). Analog experiments in volcanology: towards multimethod, upscaled, and integrated models. *Bulletin Volcanology*, 84, 52. https://doi.org/10.1007/s00445-022-01543-x
5. **Gilchrist**, J. and Jellinek, A. M. (2021). Sediment waves and the gravitational stability of volcanic jets. *Bulletin of Volcanology*, 83(10), 1-59. https://doi.org/10.1007/s00445-021-01472-1
6. Freret-Logeril, V., **Gilchrist**, J., et al. (2020). Fingering and Sediment Thermals in Ash Sedimentation from Strombolian Eruptions. *Earth and Planetary Science Letters*, 534, 116072. https://doi.org/10.1016/j.epsl.2020.116072
7. Jessop, D. E., **Gilchrist**, J., Jellinek, A. M., & Roche, O. (2016). Are eruptions from linear fissures and caldera ring dykes more likely to produce pyroclastic flows? *Earth and Planetary Science Letters*, 454, 142-153. https://doi.org/10.1016/j.epsl.2016.09.005

Invited Seminars

1. BiSEPPS Seminar — Harvard University, Mar. 25, 2026
2. Geology and Geophysics Seminar — Oregon State University, Mar. 5, 2026
3. Earth Sciences Geolunch Seminar — Dartmouth College, April 16, 2025
4. Earth Sciences Department Colloquium — University of Oregon, Oct. 17, 2024
5. Lamont Geodynamics Seminar — Columbia University, Oct. 14, 2024
6. Smithsonian Mineral Sciences Seminar — Smithsonian Institute, Mar. 29, 2023
7. Berkeley Seismology Laboratory Seminar — University of California, Berkeley, Nov. 22, 2022
8. Brock Lecture — University of British Columbia, Apr. 8, 2021

Conference Presentations

1. **Gilchrist, J. T.*** et al., (2025), Entrainment parameterization for volcanic plumes with pulsating source parameters, Oral presentation for IAVCEI 2025 Geneva, Switzerland, July 3.
2. **Gilchrist, J. T.***, et al., (2025), Quantifying "boiling-over" versus discrete eruption column collapse to predict the timing and intensity of pyroclastic density currents, Poster at IAVCEI 2025 Geneva, Switzerland, July 3.
3. **Gilchrist, J. T.*** et al., (2024), Stepping back to the source: The expression of eruption column collapse through submarine terraces, Invited Oral presentation for 2024 AGU Fall Meeting, Washington, D.C., Dec 10.

4. **Gilchrist, J. T.*** et al., (2024), *Taking the Pulse of Unsteady Eruption Plumes Using a Multimethod Approach*, Poster at 2024 AGU Fall Meeting, Washington, D.C., Dec 10.
5. **Gilchrist, J. T.***, (2024), *Quantifying "boiling-over" versus discrete eruption column collapse to predict the timing and intensity of pyroclastic density currents*, Oral presentation at Cascades 2024 Workshop, Bend, OR, Aug 30.
6. **Gilchrist, J. T.***, Jellinek, A. M., Hooft, E. E. E., & Wanket, S. (2023). *Submarine terraced deposits linked to periodic column collapse during explosive caldera-forming eruptions*. Virtual oral presentation at IAVCEI 2023 Rotorua, NZ, Jan 31.
7. **Gilchrist, J.*** et al., (2020), *Modeling the formation of axisymmetric terraces in submarine explosive eruption deposits with analog experiments*, Virtual poster at 2020 AGU Fall Meeting, Online, Dec 1-17.
8. **Gilchrist, J.*** et al., (2020), *Characterization of source unsteadiness and entrainment into explosive eruptions using laboratory- and field-based methods*, Virtual poster at 2020 AGU Fall Meeting, Online, Dec 1-17.
9. **Gilchrist, J.*** and Jellinek, A.M. (2019), *From vent to deposit: The role of sediment waves in the collapse of explosive eruption columns*, Oral presentation at 2019 AGU Fall Meeting, San Francisco, CA, Dec 9-13.
10. **Gilchrist, J. T.***, Jellinek, A. M. (2017) *Sediment waves in analog experiments simulating explosive eruption columns*, Poster at Convective and Volcanic Clouds training school/international workshop.
11. **Gilchrist, J. T.***, Jellinek, A. M. (2017) *Sediment waves in analog experiments simulating explosive eruption columns*, Poster at IAVCEI 2017 Scientific Assembly.

Awards and Achievements

Joseph B. Obering Postdoctoral Fellowship (Dartmouth, accepted) 2026
Eruption classification and landscape response to climate extremes

Transnational Access/Integrated Laboratories for Geosciences and Environment Visiting Scholar (INGV) 2025
Modelling volcanic vortex rings in the atmosphere with analog experiments

National Science Foundation Division of Earth Sciences Postdoctoral Fellowship (UO) 2024
Establishing a new eruption classification using a multimethod approach

Most Cited Early Career Researcher 2021 (IAVCEI/Bull. Of Volcanology) 2022
For the paper: Sediment waves and the gravitational stability of volcanic jets

Governor General's Gold Medal Nomination (UBC) 2022
Annual national competition for most outstanding Ph.D. dissertation at a Canadian University

Brock Lecture (Dept. of EOAS, UBC) 2021
Annual dept. award for best Ph.D. dissertation

W. H. Matthews Graduate Award (Dept. of EOAS, UBC) 2017
Dept. scholarship for graduate research on subglacial eruptions and volcano-ice interactions

APEGBC Undergraduate Achievement Award (Dept. of EOAS, UBC) 2014
Awarded for showing great promise in the field of geophysics

Work Experience

National Science Foundation EAR Postdoctoral Fellow Apr., 2024 - Present
University of Oregon, Eugene, OR

- Field and remote-sensing studies of large explosive eruption deposits and small explosive eruption ash plumes
- Quantitative measurements of flow dynamics in analog experiments on multiphase jets
- Parameterization of multiphase turbulent flow in one- and three-dimensional numerical models

Glaciologist Aug., 2022 – Mar., 2024
Brucejack Operations, Newcrest Mining Ltd., Smithers, BC

- Alpine glacier dynamics and glacial outburst flood monitoring using remote-sensing and field-based methods
- Slow-moving alpine landslide and rockfall monitoring using remote-sensing and field-based methods
- Glacier, outburst flood, and landslide material risk assessments

Research Assistant - *UBC, Vancouver, BC* May, 2011 – Aug., 2015
- *U. Oregon, Eugene, OR* Jan., 2022 – Apr. 2023

- Explosive eruption dynamics research using analog experiments and field-based methods
- Glacier and subglacial drainage dynamics research using field-based and remote-sensing methods
- Planetary science research on paleomagnetic data asteroid data in preparation for OSIRIS-Rex mission

Co-founder and Chair EOAS Climate Emergency Committee May, 2020 – Sep., 2022
University of British Columbia, Vancouver, BC

- Co-founder and chair of Earth, Ocean and Atmospheric Sciences dept. Climate Emergency Committee.
- Website development for communicating climate change research to the public and University colleagues
- Organization of public seminars by climate change scientists
- Supervision of undergraduate internships on carbon offset program ratings system for University members

Geophysical Consultant Jun. – Aug., 2019
ERM Canada – Mitchell Glacier, KSM Mine, BC

Field schools and workshops

Arctic T-SLIP Research Proposals Development Workshop	Anchorage, AK, 2026
Yakutat Landslide-induced Tsunamis Workshop	Yakutat, AK, 2025
High performance computing workshop – Research Advanced Computing Services	University of Oregon, 2025
Python for Satellite Remote Sensing: Analysis and Visualization for Earth Scientists	AGU Fall Meeting, 2024
FIAMME PDC deposit sampling workshop	Crater Lake Oregon, 2024
International Volcanology Field School – Katmai National Park	University of Alaska-Fairbanks, 2016
Convective and Volcanic Clouds detection, monitoring and modelling training school	Tarquinia Italy, 2017

Teaching

Dufek Summer Volcanology and Wildfires Reading Group – Lecturer	University of Oregon, 2024
Physical Volcanology (EEPS 1960Z) - Guest Lecturer	Brown University, 2024
First year seminar in science (SCIE 113) – Teaching Assistant	University of British Columbia, 2021
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Volcanology (EOSC 420) – Guest Lecturer	University of British Columbia, 2019
Climate change measurement and analysis (EOSC 442) - Teaching Assistant	University of British Columbia, 2019
Computer methods in Earth, ocean, atmospheric sciences (EOSC 211) - Teaching Assistant	University of British Columbia, 2018
First year seminar in science (SCIE 113) – Teaching Assistant	University of British Columbia, 2017
Topics in Earth and planetary sciences (EOSC 212) - Teaching Assistant	University of British Columbia, 2017
Topics in Earth and planetary sciences (EOSC 212) - Teaching Assistant	University of British Columbia, 2016
Topics in Earth and planetary sciences (EOSC 212) - Teaching Assistant	University of British Columbia, 2015

Service

Reviewer - Geophysical Research Letters journal	2025
Ad Hoc Reviewer – NSF EAR Postdoctoral Fellowship	2025
Reviewer - Geophysical Research Letters journal	2024
Reviewer – Journal of Geophysical Research: Solid Earth	2024
Reviewer – Volcanica journal	2024
Reviewer – Physics of Fluids journal	2022
Volunteer – UBC EOAS-School of Music "Sounds of Earth" Concert	2022
Chair – UBC EOAS Climate Emergency Committee	2020
Writer – UBC EOAS Earth Matters Magazine	2014-16
Volunteer tour guide and workshop leader – UBC Pacific Museum of the Earth	2014-18

Skills

Technical: GIS, GNSS surveying, drone photogrammetry, MATLAB, Python, data analysis, Microsoft Excel, Word and Powerpoint, Adobe Photoshop and Illustrator, LaTeX, remote-sensing, Arduino/Raspberry Pi sensor control, laboratory fluid mechanics experiments, Particle Imaging Velocimetry, computational fluid dynamics, basic machine learning algorithms.

Field: Mountaineering, Basic First Aid (2017), Wilderness First Aid (2014), Backcountry Travel (Summer and Winter), Glacier Travel, Crevasse Rescue and Avalanche Skills Training 1 (AST-1), Helicopter sling load operations

Languages: English, Spanish

References

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