Anna Barth

Miller Postdoc, UC Berkeley
barthac@gmail.com • barthac.github.io • magmaarta.com

Research interests

My research interests focus on the generation, evolution and dynamics of magma beneath volcanoes. In particular, how do crystal-rich magmas respond to magma injections from below? How are eruptions triggered? What controls eruption style? To investigate these questions my research integrates petrological data and field observations with fluid dynamical modelling and analogue experiments. An integral aspect of this work is developing new methods for conveying multivariate data using sonification and visualisation, with applications for public outreach, teaching, and scientific research.

Education

2021	Ph.D. Earth & Envi. Sci	Columbia University
2017	M.Phil. Earth & Envi. Sci	Columbia University
2015	M.Sc. Geological Sciences (top of class)	University of Cambridge
2014	B.Sc. Natural Sciences, First Class	University of Cambridge

Research experience

2021 – present	Postdoc at UC Berkeley and the Miller Institute using fieldwork, modeling, and machine learning to investigate geyser behaviour at Yellowstone NP.
2015 – 2021	Ph.D. thesis advised by Dr. Terry Plank using volatiles to understand the dynamics of magma ascent during explosive eruptions
2014 – 2015	Master's project supervised by Dr. Andy Woods and Dr. Marie Edmonds looking at the migration of gas through crystal mushes
2010	Laboratory experiments on materials with a negative poisson's ratio with Katia Bertoldi at the Material Sciences Laboratory in Harvard
2010	Assisting Mark Lancaster in the Particle Physics group at UCL

Teaching experience

2020 – 2021	Founding member of team designing course on intersection of Climate Change and Racism (GR9810) at Columbia University
2019 – 2021	Unofficial TA for Sonic and Visual Representation of Data (MUSIGR6602) at Columbia University (developed python code and helped students with projects.)
2017 – 2021	Mentor for undergraduate students Dylan Bogoevski & Sarah Shi
2018	TA for Geochemistry for a Habitable Planet (UN3101) at Columbia University
2018	TA for Field Geology (UN3010) at Columbia University
2016	TA for Solid Earth (W2200) at Columbia University

Outreach

2021 – present	Lead hands-on experiments and discussions at El Cerrito High School with other Miller Fellows
2015 – 2021	Education demonstration leader – Lamont's Open House and Columbia's Girls'

	Science Day
2016 – 2021	Organiser of Research as Art – annual exhibit of the creative endeavours of the Lamont research community
2017	Organiser of Storke student fieldtrip to the Azores
2016-2017	Geochemistry seminar organizer – Schedule and host speakers for the weekly Geochemistry Division seminar at Lamont

Honours & Awards

2019	Grand Prize in the NASA Data Visualisation and Storytelling Competition (consequently I was invited to give a presentation using the Nasa Hyperwall at AGU Fall Meeting 2019)
2018	Outstanding Student Presentation Award, AGU Fall Meeting
2015	VMSG meeting, Norwich, UK, Jan 2015: Prize for best poster of the session and best student poster of the conference
2015	First place in UK-wide Neftex Earth Model Award for Masters thesis
2015	Martin Jacks Prize from Sidney Sussex College, Cambridge
2015	Harkness Prize for graduating top of class, Earth Sciences Dept., Cambridge
2014	Samuel Taylor Scholarship for Natural Sciences by Sidney Sussex College
2014	BPI summer research bursary
2013	Travel grant to visit the ophiolite in Gros Morne National Park, Newfoundland
2013	Research grant for mapping project in Fogo Island, Newfoundland.

Computational skills

Python, MATLAB, ArcGIS, Adobe Creative Suite, Github, Cartopy, gdal

Peer-Reviewed Publications

Liu, C. N., Lin, F. C., Manga, M., Farrell, J., Wu, S. M., Reed, M. H., **Barth, A.**, … & White, E. (2023). Thumping Cycle Variations of Doublet Pool in Yellowstone National Park, USA. Geophysical Research Letters, 50(4), e2022GL101175.

Barth, A., Plank, T., & Towbin, H. (2023). Rates of dehydration in hydrous, high-Fo, magmatic olivines. Geochimica et Cosmochimica Acta, 342, 62-73

Paté, A., Farge, G., Holtzman, B. K., **Barth, A.**, Poli, P., Boschi, L., & Karlstrom, L. (2022). Combining audio and visual displays to highlight temporal and spatial seismic patterns. Journal on Multimodal User Interfaces, 1-18.

Barth, A., Karlstrom, L., Holtzman, B. K., Paté, A., & Nayak, A. (2021). Sonification and animation of multivariate data to illuminate dynamics of geyser eruptions. Computer Music Journal, 44(1), 35-50

Barth, A., & Plank, T. (2021). The ins and outs of water in olivine-hosted melt inclusions: hygrometer vs. speedometer. Frontiers in Earth Science, 9, 614004

Rose-Koga, E. F., A-S. Bouvier, G. A. Gaetani, P. J. Wallace, C. M. Allison, J. A. Andrys, **A. Barth** et al. "Silicate melt inclusions in the new millennium: A review of recommended practices for preparation, analysis, and data presentation." Chemical Geology (2021): 120145

Reed, M. H., Munoz-Saez, C., Hajimirza, S., Wu, S. M., **Barth, A.**, Girona, T., ... & Manga, M. (2021). The 2018 reawakening and eruption dynamics of Steamboat Geyser, the world's tallest active geyser. Proceedings of the National Academy of Sciences, 118(2), e2020943118.

Newcombe, M. E., Plank, T., Zhang, Y., Holycross, M., **Barth, A**., Lloyd, A. S., ... & Hauri, E. (2020). Magma Pressure-Temperature-time paths during mafic explosive eruptions. Frontiers in Earth Science, 8, 531911.

Newcombe, M. E., Plank, T., **Barth, A.**, Asimow, P. D., & Hauri, E. (2020). Water-in-olivine magma ascent chronometry: Every crystal is a clock. Journal of Volcanology and Geothermal Research, 398, 106872

Barth, A., Newcombe, M., Plank, T., Gonnermann, H., Hajimirza, S., Soto, G. J., & Hauri, E. (2019). Magma decompression rate correlates with explosivity at basaltic volcanoes—Constraints from water diffusion in olivine. Journal of Volcanology and Geothermal Research, 387, 106664.

Barth, A., Edmonds, M., & Woods, A. (2019). Valve-like dynamics of gas flow through a packed crystal mush and cyclic strombolian explosions. Scientific reports, 9(1), 821.

Donaldson, C., Sood, R., **Barth, A**., Christie, H., & Kerr, A. C. (2015). Geological relationships in northwestern Fogo Island and their implications for the timing of orogenic events. Newfoundland Department of Natural Resources, Geological Survey, Report 2015-1, 27-42. Report, 15(1), 27-42.