# Anna Barth

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## 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

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| Dec 2020 (expected) | 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

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| 2015 – present | 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

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| 2020 – present | Founding member of team designing course on intersection of Climate Change and Racism (GR9810) at Columbia University |
| 2019 – present | Unofficial TA for Sonic and Visual Representation of Data (MUSIGR6602) at Columbia University (developed python code and helped students with projects.) |
| 2017 – present | 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 & Service

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| 2020 | Judge for AGU Michael H. Freilich Student Visualization Competition |
| 2015 – present | Education demonstration leader – Lamont's Open House and Columbia's Girls' Science Day |

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| 2016 – present | 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 |

## Honours & Awards

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| 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

## Peer-Reviewed Publications

**Barth A.**, Plank, T., (*Submitted to Frontiers in Earth Science)* The ins and outs of water in olivine-hosted melt inclusions: hygrometer vs speedometer.

**Barth A.**, Karlstrom, L., Holtzman, B., Niyak, A., Paté, A (*Accepted to Computer Music Journal, MIT Press)*. Sonification and animation of multivariate data illuminates geyser eruption dynamics.

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

Newcombe, M., Plank, T., **Barth, A.**, Asimow, P., Hauri, E. (2019). Water-in-olivine magma ascent chronometry: Every crystal is a clock. Journal of Volcanology and Geothermal Research, 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.