Dr SAM **POPPE** BSc MSc PhD

Researcher –Geoscience – Planetary Volcanology

Contact

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Personal

Birth Date & Nationality: 3 May 1989, Belgium

Online presence
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Education & Career History

2007-2010 BSc Science in Geology, Ghent University (Belgium) Grade: *Distinction*
2010-2012 MSc Science in Geology – Major Basin Dynamics, Ghent University (Belgium) Grade: *Greatest Distinction* (2010-2011 Erasumus, University of Tromsø, Norway)
2012-2014 Scientific Staff / Researcher – Geologist, Dept. Geography, Vrije Universiteit Brussel (Belgium) Project: Geo-Risk in Central-Africa
2014–2019* FWO-Flanders **Ph.D. Aspirant**, Vrije Universiteit Brussel (Belgium)
**including 1-yr extension after 3-month parental leave in 2017*
11/2019-07/2020 Fulbright – B.A.E.F. **postdoctoral scholar**, Dept. Geosciences, The Pennsylvania State University (U.S.A.) Project: Lab Volcano Geodesy
10/2020-(interrupted) frs-FNRS **postdoctoral researcher**, Dept. Geosciences, Environment & Society, Université Libre de Bruxelles (Belgium) Project: MagmaTect-4D
08/2021-recent ULAM **scholar (NAWA) and Principle Investigator (NCN Poland)**, Space Research Centre – Polish Academy of Sciences [SRC PAS] (Poland) Project: DeMo-Planet

Publications

15 Papers **265** Citations (Scopus) **375** cfr. Google Scholar **9** H index (Scopus) **11** cfr. Google Scholar

1-st Author 6 Papers 3 Data sets

Poppe et al. (2015) Sinkholes, pit craters, and small calderas: Analog models of depletion-induced collapse analyzed by computed X-ray microtomography. *GSA Bull.*
Poppe et al. (2016) Holocene phreatomagmatic eruptions alongside the densely populated northern shoreline of Lake Kivu, East African Rift: timing and hazard implications. *Bull. Volcanol.*
Poppe et al. (2019) An inside perspective on magma intrusion: Quantifying 3D displacement and strain in laboratory experiments by dynamic X-ray Computed Tomography. *Frontiers Earth Scie.* [+ *Zenodo.org* data set]
Poppe et al. (2020) Structural and geochemical interactions between magma and sedimentary host rock: the Hovedøya case, Oslo Rift, Norway. *Geochemistry Geophysics Geosystems* [+ *Zenodo.org* data set]
Poppe et al. (2021) Mechanical properties of quartz sand and gypsum powder (plaster) mixtures: implications for laboratory model analogues for the Earth's upper crust. *Tectonophysics* [+ *GFZ Data Services* data set]
Poppe et al. (2022) Analog experiments in volcanology: towards quantitative, upscaled and integrated models. *Bull. Volcanol.*

2 Dissertations

Poppe (2012). Collapse calderas on basaltic shield volcanoes. *M.Sc. thesis, Ghent University* (18/20).
Poppe (2019). Magma intrusion and related deformation of the Earth's upper crust in nature and analogue experiments. *Ph.D. thesis, Vrije Universiteit Brussel.*

Conference abstracts: 29 1st-author

Co-author 9 Papers 2 Data sets

Smets, … **Poppe** et al. **(2016)** The role of inherited crustal structures and magmatism in the development of rift segments… *Tectonophys.*
Mossoux, … **Poppe** et al. **(2016)** Hazagora: will you survive the next disaster? – A serious game to raise awareness… *Nat. Haz. Earth Sys.*
Mossoux, … **Poppe** et al. **(2016)** Q-LAVHA: A flexible GIS plugin... *Comput .Geoscie.*
Barette, **Poppe** et al. **(2017)** Spatial variation of volcanic rock geochemistry in the Virunga Volcanic Province... *J. Afr. Earth Scie.*
Grosse, **Poppe** et al. **(2020)** Volcano growth versus deformation by strike-slip faults: morphometric characterization through... *Tectonophys.*
Dille, **Poppe** et al. **(2020)** Modeling lahars on a poorly eroded basaltic shield:… *Frontiers Earth Scie.*
Walker, … **Poppe (2021)** Segment tip geometry of sheet intrusions I. *Volcanica*
Smittarello, … **Poppe, … (2022)** Precursor-free eruption triggered by edifice failure at Nyiragongo volcano. *Nature*
Holohan, **Poppe, … (2023)** Transition from volcano-sagging to volcano-spreading. *Earth Planet. Scie. Lett.*

1 Chapter

Delcamp, **Poppe** et al. (2018). Destroying a volcanic edifice - interactions between edifice instabilities and the volcanic plumbing system. In S. Burchardt (Ed.), Elsevier.

1 Map

Smets, **Poppe** (2016). Volcanological map of Nyamulagira and Nyiragongo, Virunga Volcanic Province, North Kivu, Democratic Republic of Congo. Tervuren, Belgium

➢ See an up-to-date list at https://sampoppevolcano.wixsite.com/sampoppe/publications

Scientific grants and prizes **9 grants (> € 300 000)** **1 Prize**

2012 IAVCEI Travel grant for attending the Collapse Caldera workshop in Bolsena, Italy
2014 Personal grant of the Belgian foundation Vocatio (€10.000)
2014 Personal Ph.D. aspirant grant from the Flemish Science Foundation (FWO-Flanders)
2014 Personal 'VLADOC' Ph.D. fellowship from VLIR-UOS (refused due to FWO grant)
2014 Ranked first for Ph.D. fellowship at University of Oslo, Norway (refused due to FWO grant)
2018 Science Communication Year Prize of the Royal Flemish Academy of Belgium (RFAB)
2018 Travel grant from FWO-Flanders for attending the AGU 2018 Fall Meeting, Washington D.C.
2019 Fellowships from Fulbright ($11 000) and Belgian-American Educational Foundation (B.A.E.F.) ($45 000) for one-year postdoctoral stay at Pennsylvania State University, U.S.A.
2020 frs-FNRS Postdoctoral fellowship, Belgium, (3 years, €15,000), interrupted after 06/2021
2021 ULAM visiting scholar fellowship (NAWA, Poland) at Space Research Centre, PAS
2021 POLS project (~€202,700) from Polish National Science Centre NCN at SRC PAS

#SciComm and Scientific Outreach

Overarching Science Communication strategy about volcanoes and their eruptions towards the public and journalists awarded with 2018 SciComm RFAB (KVAB) Year Prize

@SamPVolcano
1368 followers
- Explaining and fact-checking volcano news and advocating for human working conditions in academia

YouTube
9 movies
- Helped producing and presenting "Hazagora" hazard movies: https://www.youtube.com/watch?v=Y6zv8lTZ5-s
- "Universiteit van Vlaanderen" seminars (incl. National TV web-stream): https://www.youtube.com/watch?v=voxeO1cAJpU https://www.youtube.com/watch?v=wVFDpQXjUo8

#SciComm
- Opinion pieces posted on personal blog website https://sampoppevolcano.wixsite.com/sampoppe/research-blog; science blog wtnschp.be https://www.wtnschp.be/wetenschap/natuur/geo/alles-over-vulkanen/; popular magazine Knack.be: "How dangerous are volcanoes?" https://www.knack.be/nieuws/wetenschap/hoe-gevaarlijk-zijn-vulkanen/article-opinion-977199.html; SKEPP magazine "Wonder en is gheen wonder"; Interviewee in 2022 documentary "Science Friction" https://sciencefriction.tv/

>25 questions
- Scientific expert answering scientific questions on www.ikhebeenvraag.be (including 10 000th response publicly advertised)

>30 mentions
- Interactions with school students via e-mail and class visits
- Interactions with (Flemish) print media, radio and TV: BBC, The Weather Channel, Flanders Today, Het Nieuwsblad, De Standaard, P-Magazine, Radio 1, VRT Nieuws, VTM Nieuws, Bruzz.be

>10 workshops
- Part of development team for serious game "Hazagora" (winner of Innoviris Brussels grant (€5.000), 2016 SciComm RFAB Year Prize).

Research summary

I am a geologist focusing on **structural deformation** of volcanic edifices on **terrestrial planetary bodies**. My research aims to understand **how volcano-tectonic processes deform** the shallow crust and ultimately a rocky planet´s surface, to better inform volcanic eruption forecasts on Earth and the reconstruction of volcanic history of terrestrial planetary bodies in our Solar System. I use a **multi-method approach** that combines field work using **structural geology** techniques and **Uncrewed Aerial Vehicles** ("drones") at active volcanoes in the broader **East African Rift** and inactive eroded systems in **Norway** and **Poland**; remote observations on terrestrial planetary bodies (**the Moon, Mars**); **laboratory modelling** where I pioneered 4D monitoring with medical and micro- X-ray Computed Tomography; **geochemical and mechanical** rock sample analysis; and **analytical and numerical modelling**. I am currently the **PI of the DeMo-Planet project** that aims to numerically model magma-induced dynamic fracturing in the shallow crust of the Moon and Mars. I am also member of the **science team for the Lunar Geology Orbiter** (LUGO), currently in Phase 0 study funded by ESA (OSIP).

Experiences

Science Team

2012-2014 **Geo-Risk in Central Africa (GeoRisCA)** – employed researcher – funding: BELSPO
2022-current **Lunar Geology Orbiter (LUGO)** – scientific advisor, science justification – funding: ESA

Teaching

2012-2018 *(16hrs/sem)* 4 practical sessions "**Global Geomorphology**", 2nd B.Sc. in Geography, Vrije Universiteit Brussel
2013-2018 *(12hrs/sem)* 1 lecture and 2 practical sessions "**Volcanology**", M.Sc. in Geology, Ghent University
2018 *(2 hrs)* Guest lecture and forum "**People and volcanoes**" for Studium Generale public lecture series "Unrest and discomfort", Antwerp University
2020 Spring *(40hr/sem)* Graduate Course "**How to model a volcano in the lab and numerically**", the Pennsylvania State University
Since 2022 *(1hr bi-weekly)* Moderator of Mars Exploration Lab paper discussion group, SRC PAS

Supervision of students and young scientists

2012 – 2019	Mentor/supervising assistant: 4 MSc students, 6 BSc students (VUB, Belgium)
2012 – 2014	Mentor of 2 young scientists during field work (Goma Volcano Observatory, DRC)
2015	Mentor of 2 BSc students during field work (Observatoire Volcanologique du Karthala, Comoros)
2021 – 2022	Co-supervisor: 1 MSc student (VUB, Belgium)
2022 – 2023	Supervisor (P.I.) of 1 Postdoc, 1 MSc internship student; Mentor of 2 PhD students, 1 BSc student; Space Research Centre PAS (CBK PAN), Poland

Field Experience

2011 *(5 weeks)* Structural mapping and monitoring training, Karthala volcano, **Comoros**
2013 *(2 times 2 weeks)* Stratigraphy and morphology of the Virunga Volcanics, **D.R.C. and Rwanda**
2015 *(6 weeks)* Mapping volcanic deposits and structures, **Comoros**
2016 *(2 weeks)* Describing magmatic intrusions on Hovedøya island, **Oslo fjord, Norway**
2021 *(2 days)* Describing magmatic intrusions in the Intra-Sudetic Basin, **Poland**

Research Visits

2015 *(3 days)* Field work preparation and Ph.D. planning, **Oslo University**, Oslo, Norway
2015 *(2 weeks)* Analogue material characterisation, **Helmholtz Centre Potsdam - GFZ**, Germany
2016 *(3 weeks)* Analogue material characterisation, **University of Main**, France
2017 *(1 week)* Manuscript co-writing on analogue modeling results, **University College Dublin**, Ireland
2018 *(1 week)* Interpreting tephrochronological results and co-writing, **Cambridge University**, U.K.

Invited research seminar presentations

GFZ Potsdam (Germany), Oslo University (Norway), University College Dublin (Ireland), Laboratoire Magmas et Volcans, Clermont-Ferrand (France), Belgian Seismological Observatory (Belgium), Cambridge University (U.K.), Bristol University (U.K.), IAVCEI VIPS webinar series (online), University of Liverpool (UK), EGU23 Scientific Assembly solicited talk

International scientific conferences and workshops

EGU 2012 / 2016, CC Workshop 2012, CoV 2013, AiQAM 2014, Geomod 2015 / 2018, IUGG 2015, IAVCEI 2013 / 2017, AGU 2018, LASI6 2019, VMSG 2021, EGU 2022, EPSC 2022, EGU 2023

Internships

2009 *(5 weeks)* B.Sc. apprenticeship: "The influence of spreading and intrusion on the deformation of elongated volcanoes through analogue modeling, with application on Mt. Cameroon, Cameroon." Department of Geology and Soil Science, Ghent University, Belgium

Skills

Languages

Dutch Native tongue.
English very good command of reading, speaking and writing
French good command of reading, speaking and writing
German command of reading, speaking and writing
Polish basic command of reading, speaking and writing

Informatics

Good command MS Office, GIS, ENVI, Matlab/Python, Photogrammetric software (MicMac, Metashape), Adobe Illustrator & Photoshop, Inkscape, Gymp, ImageJ, 3D-scanning software (Octopus, VGSStudioMax, 3D-slicer), DaVis Strainmaster (LaVision Ltd.)

Basic knowledge statistical software (SPSS), Microsoft Office VBA, Petrel 2010, Promax

Community service

- **2023-current** **Equality, Diversity and Inclusion (EDI) officer** IAVCEI Commission of Volcanic and Igneous Plumbing Systems (VIPS)
- **2016-2023** **Journal reviewer** Nature earth & environment, Geophysical Research Letters, JGR Solid Earth, Bulletin of Volcanology, Tectonophysics, Volcanica, etc.
- **2019** **Grant reviewer** National Science Foundation
- **2022-2023** **Grant applications evaluation committee** member, Fulbright Commission Poland
- **2021-2022** **Grant applications evaluation committee** member, Fulbright Commission Belgium-Luxemburg
- **2012-2019** **Analogue Laboratory Responsible** group of Prof. Matthieu Kervyn (**VUB**)
- **2013-2020** **Founder, committee member** IAVCEI Early-Career Researchers Network (**ECR-Net**)
- **2012-recent** **Young Researcher/Donor member** International Association for Volcanology and Chemistry of the Earth's Interior (IAVCEI)
- **2022-recent** **Europlanet Society** member
- **2018-recent** **American Geophysical Union** member
- **2012-recent** **European Geoscience Union** member
- **2013-2017** **Teaching assistant representative** B.Sc. Working Group, Dept. Geography, VUB
- **2008-2012** **Student representative** Education Commission, Dept. Geology, Ghent University
- **2010** **Student member** Evaluation Committee for the Open position in Marine Geology and Geophysics at the Department of Geology and Soil Science, Ghent University