

PHILIPPA LIGGINS

Research Software Engineer - University of Oxford

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EXPERIENCE

Research Software Engineer

OxRSE, University of Oxford

Jan 2023 - Present Oxford, UK

Working within small teams to support and develop software and development infrastructure for scientific research.

- Developed a data processing pipeline in collaboration with ISARIC and Global.Health to reduce the time from disease outbreak to clinical research publication during epidemics.
- Implemented a new JSON serialisation method to enable greater integration of the PyBaMM battery modelling package with other simulation tools.

Ph.D. Candidate in Earth Science

University of Cambridge

Oct 2018 - Sept 2022 Cambridge, UK

My thesis uses computation models to simulate the effect of volcanic gases on the evolution of atmospheres on the Early Earth and other planets.

- Independently** developed 2 large Python-based models of volcanic systems and atmospheres, using agile methodologies in a Linux environment. Taught myself Python3 and some C++ with minimal prior coding experience.
- Handled large datasets, presented results at large international conferences (e.g., Goldschmidt, LPSC), published multiple papers.
- Collaborated** with researchers both internally and at other institutions (Bristol, CalTech, GNS New Zealand), extensive experience in **technical writing**, to journal and conference deadlines.
- Participated in the 2019 Royal Society Summer Science Exhibition, communicating project science to the general public.

University teaching - Scientific Computing

University of Cambridge

Oct 2018 - Dec 2022 Cambridge, UK

- Provide in-lab guidance for 3rd year undergraduate students.
- Taught Python, with a focus on applications in Earth Sciences using packages such as NumPy, Pandas and Cartopy.
- Provide example answers to independent coding exercises.

SELECT PUBLICATIONS

- Liggins, P., Jordan, S., Rimmer, P.B., and Shorttle, O. *Journal of Geophysical Research: Planets*, 128, e2022JE007528. (2023).
- Hughes, E.C., Saper, L., Liggins, P., O'Neill, H.S.C., and Stolper, E.M. *Journal of the Geological Society*, 180(3) (2023).
- Liggins, P., Jordan, S., Rimmer, P.B., and Shorttle, O. *Journal of Geophysical Research: Planets*, 127(7), e2021JE007123. (2022).
- Liggins, P., Shorttle, O., and Rimmer, P.B. *EPSL*, 550, 116546. (2020)

TECHNICAL SKILLS

Programming languages

- Highly proficient in **Python** and have experience writing and integrating **C++**.
- Proficient using **MATLAB** and have web development experience using **Django**, **HTML5** and **Streamlit**.
- Confident with **LaTeX** markup language.

Software development

- Familiar with common design patterns and language features (incl. object orientation, advanced data structures).
- Experienced in source control using **Git**. Some experience with **HPC environments** (through NCAS training courses on the Met Office Unified Model) and knowledge of **machine learning** fundamentals.
- Experience utilising root-finding methods and implementing high-precision versions of common NumPy/SciPy algorithms (e.g., Newton-Raphson, Jacobian matrices) in MPFR.
- Familiarity **translating** Pascal code into Python and **packaging** code for release.

Data analysis and presentation

- Proficient working with large datasets, including Pandas/NumPy for manipulating tabular data and Matplotlib for visualisation.
- Experience using **SPSS** and **ArcGIS**.

EDUCATION

Ph.D. Earth Science

University of Cambridge

Oct 2018 - Sept 2022

Thesis title: The Atmospheric Fingerprints of Volcanism; Simulating volcanic outgassing and secondary atmospheres on rocky planets

M.Sci. Earth and Environmental Science (First class Honours)

Lancaster University

Sept 2014 - June 2018

Graduating Top of Class.
Masters level modules inc. *Geoinformatics* and *Data Analysis and Interpretation*.