RESEARCH ASSISTANT POSITION
Department of Earth Sciences, University of Oxford

*Developing a Jupyter Notebooks companion for a new textbook on magma/mantle dynamics*

*Supervisor --- Prof. Richard F Katz (Earth Sciences, Oxford)*

Deep beneath volcanos, partial melting of the Earth’s mantle creates a two-phase aggregate: a matrix of granular mantle rock that contains liquid magma in a permeable network of pores between grains. The solid matrix deforms by creeping viscous flow; the liquid magma segregates from the solid by porous flow. The dynamics of both phases are described by a system of PDEs based on conservation of mass, momentum and energy with empirical constitutive relationships. Despite this physical and mathematical richness, there is no published book on the subject that brings together the theory and applications.

The successful applicant will develop a set of Jupyter Notebooks as a companion to a forthcoming textbook by Prof. Katz about the dynamics of partially molten rocks, to be published by Princeton University Press (PUP).

The notebooks will present and describe a set of simple Python codes that perform the calculations and generate figures as shown in the book. Rough Matlab codes for most of the calculations already exist and will need to be translated to Python; for a few calculations it will be necessary to develop Python code from scratch. There is also scope for developing and including new calculations and codes, as appropriate.

The work will involve reading the draft textbook to gain an adequate understanding of the material, designing an overarching webpage structure for the notebooks with appropriate PUP branding, populating the structure with Markdown-based text and equations, writing and incorporating interactive code elements.

The successful applicant for this position need not have any background in Earth Sciences, but will have experience with Python programming and a familiarity with numerical solutions to differential equations. Importantly, s/he should have a passion for writing elegant, clear, and well-documented code. Self-motivation and independence are key selection criteria.

The successful applicant, if working locally, will join the FoaLab research group at the University of Oxford’s Department of Earth Sciences led by Prof. Richard Katz. However, the work may be done remotely and without any set hours. The total pay for the project is £1600, to be apportioned and paid by chapter, according to the number of codes/figures. Work to commence as soon as the successful applicant is ready, and to complete before the end of 2019. To apply, email a CV with names/email addresses of two referees and a 1-page (maximum) statement of interest to richard.katz@earth.ox.ac.uk before Friday 26 July 2019. PDF documents only, please. Enquiries welcome.