

Curriculum Vitæ – Richard Foa Katz

Department of Earth Sciences
University of Oxford
South Parks Road, Oxford OX1 3AN, UK

phone: +44-1865-282122
email: richard.katz@earth.ox.ac.uk
web: <http://foalab.earth.ox.ac.uk>

ACADEMIC POSITIONS

- 2011– **University Lecturer**, Department of Earth Sciences, University of Oxford, UK.
2007– **Research Councils UK Academic Fellow**, Department of Earth Science,
2012 University of Oxford, UK.
2006– **Senior Research Fellow**, Institute of Theoretical Geophysics, Department of
2008 Applied Mathematics and Theoretical Physics, University of Cambridge, UK.
2006 **Postdoctoral Researcher**, Lamont-Doherty Earth Observatory, Columbia
University, NY.

EDUCATION

- 2005 **Ph.D. with distinction**, Columbia University, NYC, NY, USA. Dissertation:
*The Deep Roots of Volcanoes: Models of Magma Dynamics with Applications to
Subduction Zones*, supervisor: Marc Spiegelman.
2000 **B.A. Cum Laude**, Cornell University, Ithaca, NY, USA.

AWARDS & FELLOWSHIPS

- 2012 The European Geosciences Union’s **Division Outstanding Young Scientist
Award for the Division on Geodynamics**, to be presented at the EGU
General Assembly in Vienna, April 22–27, 2012.
2008 ***New Journal of Physics* 10th Anniversary Highlights** included my 2005
[paper on wax tectonics](#).
2007 **Research Councils UK Academic Fellowship**. £125k for five years salary
support at Univ. Oxford.
2006 **US National Science Foundation International Research Fellowship** for
two years postdoctoral study at Univ. Cambridge.
2003 **Outstanding Student Paper Award**, AGU-EGS joint session, Nice, France.
2001 **Outstanding Student Paper Award**, AGU Fall Meeting, San Francisco, USA
- **US Department of Energy Computational Science Graduate Fellow-
ship** for four years Ph.D. research at Columbia University.

SELECTED RECENT GRANTS

- 01/12/10 **NERC Standard Grant**. [*awarded*] £338k over three years to hire two PDRAs.
Four PIs; collaborative between Cambridge and Oxford. To develop finite ele-
ment models of magma dynamics.
14/10/10 **European Research Council Starter Grant**. [*awarded*] €1.4M over five
years to hire two PDRAs and one student to study coupling of climate with
magmatism at mid-ocean ridges.
04/09/10 **Royal Society Travel Grant**. [*expired*] £4000 to support a 1-month Oxford
visit by Prof. Y. Takei of ERI, Tokyo in 2011.
01/08/09– **Natural Environmental Research Council New Investigator Grant**.
31/07/10 [*expired*] “Coupled models of magma/mantle dynamics: melt transport at mid-
ocean ridges and subduction zones.” £55k over two years for personal salary
support, overhead, travel, consumables. NERC ref. NE/H00081X/1.
01/09/06– **US National Science Foundation International Research Fellowship**
31/08/08 **Program**. [*expired*] \$163,057 over two years covering salary, travel, research
expenses. NSF award #0602101.

MANUSCRIPTS IN PREPARATION

- **R.F. Katz** and S. Weatherley, Consequences of mantle heterogeneity for melt extraction at mid-ocean ridges. Submitted to *EPSL*.
- P.M. Gregg, L.B. Hebert, L.G.J. Montési, and **R.F. Katz**, Geodynamic models of melt generation and extraction at mid-ocean ridges. Accepted at *Oceanography*.
- S. Weatherley and **R.F. Katz**, Recycled oceanic crust and magmatic channelisation in the mantle.
- **R.F. Katz**, C. Langmuir, and P. Huybers, Sea-level control of crustal production at mid-ocean ridges.
- P. Huybers, **R.F. Katz**, and C. Langmuir, A delayed CO₂ oscillator for the Quaternary glacial cycles.
- **R.F. Katz**, Y. Takei, Consequences of anisotropic viscosity in deforming, partially molten aggregates.

PUBLICATIONS

- 2011 **R.F. Katz** and J. Rudge, The energetics of melting fertile heterogeneities within the depleted mantle. *Geochem. Geophys. Geosys.*, doi: [10.1029/2011GC003834](https://doi.org/10.1029/2011GC003834).
- 2010 England, P.C. and **R.F. Katz**, Dry melting and thermal advection in the mantle wedge control the location of volcanic arcs. *Nature*, doi: [10.1038/nature09417](https://doi.org/10.1038/nature09417).
- England, P.C. and **R.F. Katz**, (Brief Communication Arising) Global systematics of arc volcano position. *Nature*, doi: [10.1038/nature09154](https://doi.org/10.1038/nature09154).
- **Katz, R.F.** Porosity-driven convection and asymmetry beneath mid-ocean ridges. *Geochem. Geophys. Geosys.*, doi: [10.1029/2010GC003282](https://doi.org/10.1029/2010GC003282).
- Weatherley, S. and **Katz, R.F.** Plate-driven dynamics and global patterns of mid-ocean ridge bathymetry. *Geochem. Geophys. Geosys.*, doi: [10.1029/2010GC003192](https://doi.org/10.1029/2010GC003192).
- **Katz, R.F.** and M.G. Worster. Stability of ice-sheet grounding lines. *Proc. Roy. Soc. A*, doi: [10.1098/rspa.2009.0434](https://doi.org/10.1098/rspa.2009.0434).
- 2008 **Katz, R.F.** Magma dynamics with the Enthalpy Method: benchmark solutions and magmatic focusing at mid-ocean ridges. *J. Petrology*, doi: [10.1093/ptrology/egn058](https://doi.org/10.1093/ptrology/egn058).
- **Katz, R.F.** and M.G. Worster. Simulation of directional solidification, thermochemical convection and chimney formation in a Hele-Shaw cell. *J. Comp. Phys.*, doi: [10.1016/j.jcp.2008.06.039](https://doi.org/10.1016/j.jcp.2008.06.039).
- van Keken, P., C. Currie, S.D. King, M.D. Behn, A. Cagnioncle, J. He, **R.F. Katz**, S. Lin, E.M. Parmentier, M. Spiegelman, K. Wang, A community benchmark for subduction zone modelling. *Phys. of the Earth and Planetary Interiors*, doi: [10.1016/j.pepi.2008.04.015](https://doi.org/10.1016/j.pepi.2008.04.015).
- 2007 **Katz, R.F.**, M. Knepley, B. Smith, M. Spiegelman, E. Coon. Numerical simulation of geodynamic processes with the Portable Extensible Toolkit for Scientific Computation, *Phys. of the Earth and Planetary Interiors*, doi: [10.1016/j.pepi.2007.04.016](https://doi.org/10.1016/j.pepi.2007.04.016).
- 2006 **Katz, R.F.**, M. Spiegelman, and B. Holtzman, The dynamics of melt and shear localisation in partially molten aggregates. *Nature*, doi:[10.1038/nature05039](https://doi.org/10.1038/nature05039).

- Knepley, M.G., **R.F. Katz**, and B.F. Smith. Developing a geodynamics simulator with PETSc. In Numerical Solution of Partial Differential Equations on Parallel Computers, Series: Lecture Notes in Computational Science and Engineering, Vol. 51, A.M. Bruaset and A. Tveito, editors. Springer-Verlag.
- Spiegelman, M. and **R.F. Katz**. A semi-Lagrangian Crank-Nicolson algorithm for the numerical solution of advection-diffusion problems, *Geochem. Geophys. Geosys.*, doi: [10.1029/2005GC001073](https://doi.org/10.1029/2005GC001073).
- 2005 **Katz, R.F.**, R. Ragnarsson, and E. Bodenschatz. Tectonic microplates in a wax model of sea-floor spreading, *New J. Phys.*, doi: [10.1088/1367-2630/7/1/037](https://doi.org/10.1088/1367-2630/7/1/037)
- **Katz, R.F.** and E. Bodenschatz, Taking wax for a spin: tectonic microplates in an analog model of plate tectonics. *Europhys. News*, Vol. 5. (unrefereed)
- 2004 **Katz, R.F.**, M. Spiegelman and S. Carbotte. Ridge migration, asthenospheric flow and the origin of magmatic segmentation in the global mid-ocean ridge system. *Geophys. Res. Ltrrs.*, doi: [10.1029/2004GL020388](https://doi.org/10.1029/2004GL020388)
- 2003 **Katz, R.F.**, M. Spiegelman and C.H. Langmuir. A new parameterisation of hydrous mantle melting. *Geochem. Geophys. Geosys.*, doi: [10.1029/2002GC000433](https://doi.org/10.1029/2002GC000433)

INVITED CONFERENCE LECTURES

- 2012 Keynote talk at the [Gordon Research Conference on Rock Deformation](#), Andover, New Hampshire, USA (upcoming).
- 2011 [AGU Fall Meeting](#), San Francisco, USA (upcoming). Two invited talks. [VMSG Conference](#), Cambridge, UK. Keynote address (program substitution).
- 2010 [American Geophysical Union](#), San Francisco, USA. [European Geosciences Union](#) conference in Vienna, Austria. Session [GMPV16/GD5.9](#)
- 2009 (Keynote) [11th International Workshop on Modelling of Mantle Convection and Lithospheric Dynamics](#), Braunwald, CH; [Water on Earth and Beyond](#) conference, Durham, UK; [In-situ Geophysical Studies of Planetary Surfaces: Past, Present, and Future](#), Roy. Astro. Soc. meeting, London.
- 2008 [Computational Infrastructure for Geodynamics \(CIG\) Workshop on Mathematical and Computational Issues in the Solid Earth Geosciences](#), Santa Fe, USA.
- 2006 (Keynote) [Penrose Conference on Arc Crustal Genesis and Evolution](#), Valdez, Alaska; [Western Pacific Geophysics Conference](#), Beijing, China.
- 2005 [Fall AGU meeting](#), San Francisco, USA.
- 2004 [Fall AGU meeting](#), San Francisco, USA.

PROJECT SUPERVISION

- 2011– **Jen Truby**, MSc student since Autumn 2011. Project: experimental study of gas percolation through a viscoelastic, granular medium with applications to silicic magma-chamber degassing.
- 2011– **Adina-Erika Pusok**, MSc student since Autumn 2011. Project: Active convection in the mantle beneath mid-ocean ridges: computational models and scaling analysis.
- 2010– **Teresa Kyrke-Smith**, PhD student since Autumn 2010. Project: Ice stream emergence in coupled models of ice sheets and subglacial hydrology.
- 2010– **Matt Hennessy**, MSc project in [applied mathematics](#): Tyndall figures in melting ice. (Co-supervised by Dr. S. Peppin, OCCAM)

- 2009– **Samuel Weatherley**, PhD student since Autumn 2009. Project: Reactive magmatic flow in a deforming mantle. Also MSc project, 2008-9: Influence of mantle dynamics on global patterns of mid-ocean ridge bathymetry.
- 2009– **Natasha Sheel**, MSc project: Melting-induced buoyancy and convection beneath mid-ocean ridges.

TEACHING

- 2011 Invited lecturer, Abdus Salam International Centre for Theoretical Physics **Advanced School on Mechanical and Thermal Processes in Geodynamics**.
- 2011– **Mathematical Problem-Solving in Earth Science** for second-year students in Earth Science at Oxford. My contribution to the total course is 8 hours of **lectures** + 8 hours of practical classes on Fourier analysis, waves and diffusion.
- 2010– **Introduction to Physical Thermodynamics** for first-year students in Earth Science at Oxford. 10 hours of **lectures** plus practicals.
- 2008– Tutor for **Mathematics for Materials and Earth Sciences** at Oxford. Weekly problem classes.
- 2008– Demonstrator for the **Oxford volcanology field trip** to Santorini, Greece.
- 2002 **Environmental Science for Decision Makers**, Quantitative Analysis Section for Public Policy masters students at Columbia University. 9 hours of lectures plus problem classes.

OTHER TRAINING AND QUALIFICATIONS

- 2011 Member of the Oxford Supercomputing Centre Executive Committee.
- 2011 Session convener for the 2012 European Geosciences Union General Assembly, Vienna, Austria, and the 2012 Goldschmidt Conference, Montreal, Canada.
- 2010 Session convener for the 2010 European Geosciences Union General Assembly, Vienna, Austria. Session **GD1.4**.
- Reviewer for journals including *Nature*, *J. Petrology*, *J. Fluid Mechanics* and for the UK NERC and the US NSF.
- Language skills: fluency in Italian; basic French and Spanish.
- 2009 Public lecture at **Science Oxford** on the L'Aquila earthquake.
- 2008 Session convener at Goldschmidt geochemistry conference, Vancouver, Canada.
- 2007 Completed two-month training in peer-support counselling of graduate students, University of Cambridge.