

CHRISTOPHER HAVLIN

Lamont-Doherty Earth Observatory, Columbia University
Seismology, Geology and Tectonophysics Division
230C Seismology
61 Route 9W – PO Box 1000, Palisades, NY, 10964-8000

Phone: +1.845.365.8345
chavlin(at)ldeo.columbia.edu

Education

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| Boston University Boston, MA | B.A., Geophysics and Planetary Science Research Focus: 3D numerical modeling of mantle plumes using CitcomCU Research Advisor: Paul Hall | 2009 |
| Brown University Providence, RI | M.Sc., Geological Sciences Thesis Title: The role of a partially molten boundary layer during the initiation and evolution of continental rifting Advisors: Marc Parmentier, Greg Hirth | 2011 |
| Brown University Providence, RI | Ph.D., Geological Sciences General focus: computational geodynamics Thesis title: Dynamics of Melt-Lithosphere Interaction Advisors: Marc Parmentier, Greg Hirth | 2015 |

Appointments

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| <i>Postdoctoral Researcher</i> , Lamont-Doherty Earth Observatory, Columbia University | 2015-present |
| <i>Sponsored Scientist</i> , Department of Geological Sciences, Brown University | 2014-2015 |
| <i>Research Assistant</i> , Department of Geological Sciences, Brown University | 2009-2014 |
| <i>Teaching Assistant</i> , Solid Earth Geophysics, Brown University | 2010, 2012 |
| <i>Undergraduate Research Assistant</i> , Center for Space Physics, Boston University | 2007-2009 |
| <i>Undergraduate Research Assistant</i> , Department of Earth Sciences, Boston University | 2008-2009 |

Honors

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| <i>Earth Sciences Undergraduate Research Award</i> , Boston University | 2009 |
| <i>Center for Space Physics Undergraduate Research Award</i> , Boston University | 2009 |

Publications

Havlin, C., E.M. Parmentier and G. Hirth (2013), *Earth and Planetary Science Letters*, Dike propagation driven by melt accumulation at the lithosphere-asthenosphere boundary, 376 : 20-28, <http://dx.doi.org/10.1016/j.epsl.2013.06.010>.

Havlin, C. and E.M. Parmentier, (2014), *Geophysical Research Letters*, Implications for melt transport and source heterogeneity in upwelling mantle from the magnitude of Sp converted phases generated at the onset of melting, 41, 5444–5450, <http://dx.doi.org/10.1002/2014GL060890>.

Havlin, C., E.M. Parmentier and G. Hirth (in preparation), Melt migration beneath thinning lithosphere.

Teaching Experience and Outreach

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| May 2015 | Seismic Sound Lab (seismicsoundlab.org) guide at LDEO, “Sounds of Seismology” |
| 2013-2014 | Co-advisor for Brown undergraduate Roque Soto-Castaneda, recipient of an Undergraduate Teaching and Research Award (UTRA) at Brown. Co-advised with Marc Parmentier. |
| 2010,2012 | Teaching Assistant for Solid Earth Geophysics (Brown University, GE1610) |
| Jan. 2013 | Exhibition night judge, Blackstone Academy Charter School, Pawtucket RI |
| 2012 | Lesson planning and teaching, Vartan Gregorian Elementary School, Providence RI |

Professional Activities

Invited Talks

- 2014 AGU Fall Meeting, San Francisco, CA. “Sp receiver functions generated at melting onset: insight from geodynamic models and synthetic receiver functions.”
- 2012 Boston University Solid Earth Seminar, Boston, MA. “Source limited dike propagation and implications for tectonics.”

Selected Presentations

- 2015 Noman symposium on the Structure and Dynamics of the Lithosphere/Asthenosphere System, Miyagi, Japan. Poster: “Melt migration beneath thinning lithosphere”
- 2014 CIG-EarthScope Institute for Lithospheric Modeling Workshop, Tempe, AZ. Poster: “Melt migration, accumulation and lithosphere infiltration using the immersed boundary method ”
- 2013 AGU Fall Meeting, San Francisco, CA. Talk: “The evolution of lithosphere deformation due to infiltration of asthenosphere melt into a lithosphere with inherited weakness: insight from 2D numerical models of continental rifts”
- 2012 AGU Fall Meeting, San Francisco, CA. Talk: “Development of a sloping lithosphere-asthenosphere boundary and its effect on melt accumulation and lithosphere heating.”
- 2012 GeoPRISMS Science Workshop for East Africa Rift System, Morristown, NJ. Poster: “Lithosphere thinning due to dike propagation at the lithosphere-asthenosphere boundary.”
- 2011 AGU Fall Meeting, San Francisco, CA. Poster: “Melt transport through the lithosphere by dike injection from a partially molten asthenosphere.”
- 2011 Earthscope Institute: The Lithosphere-Asthenosphere Boundary, Portland, OR. Poster: “Dike propagation out of a partially molten boundary layer at the base of the lithosphere: implications for the LAB”
- 2010 AGU Fall Meeting, San Francisco, CA. Talk: “Dike propagation limited by melt extraction; implications for rift initiation .”
- 2010 GeoPRISMS RIE Planning Workshop, Santa Fe, NM. Poster: “Melt generation and extraction from the upper mantle as a magma source for rifting .”

Computational Expertise and Interests

Two-phase flow: I have developed (and continue to write) finite volume codes in MATLAB and Fortran 95 to solve the system of equation describing flow of a fluid in a deforming, permeable medium. Numerical techniques have included a multigrid penalty-function formulation, implicit solutions (using the PETSc toolkit), and application of boundary conditions along topologically complex boundaries using the immersed boundary method.

Geophysical Modeling: I am currently working with a team led by Dr. Ben Holtzman at LDEO to couple geodynamic and seismic forward modeling to aid in inverting geophysical fields for thermodynamic properties such as temperature, partial melt and grain size. The calculation of seismic properties from thermodynamic state accounts for both the frequency-dependence and anelasticity of rocks based on mineral physics and laboratory studies. The MATLAB code under development will be released for use in the geophysics and geodynamics community.

Finite Element (FE) Modeling: Additionally I have used the parallelized FE code CitcomCU and multiphysics FE package COMSOL to investigate ponding of mantle plumes, thermal structure of mid-ocean ridges and formation of porosity bands in partially molten rock under shear.

Proficiencies: MATLAB, Fortran 77/95, C, Bash, PETSc, CitcomCU, COMSOL

Limited Working Knowledge: Python, MPI, IDL, ParaView

References

Ben Holtzman, *benh(at)ldeo.columbia.edu*, (845) 365 8382, Columbia University, Postdoc Supervisor

Marc Parmentier, *em_parmentier(at)brown.edu*, (401) 863-1700, Brown University, Thesis Advisor

Greg Hirth, *greg_hirth(at)brown.edu*, (401) 863-7063, Brown University, Thesis Advisor

Beyond the Desk

2005-2009 Boston University Outing Club vice president (2005-2008) and treasurer (2008-2009). Led numerous camping and backpacking trips in the White Mountains of New Hampshire.

2009-2014 Unofficial organizer of outdoors excursions amongst the graduate students of Brown University including camping, backpacking and technical rock climbing.

Memorable Technical Climbs: Moby Grape (5.8, 8 pitches) on Cannon Cliff (NH), Standard Route (5.5, 9 pitches) on White Horse Ledges (NH), Der Zerkle (5.4, 3 pitches) in the Flatirons (CO), Contortionist (5.9, 1 pitch) in Ramapo Valley (NY).