Garrett M Leahy - Curriculum Vitae

Contact Information

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Research Interests

Dynamics of the Earth's mantle (particularly volatile, heat, and melt transport), and seismological observations of the Earth's interior.

Education

Yale University, New Haven, CT USA

Ph.D., Geophysics, May 2008

- Dissertation Topic: "Structure and Dynamics of Mid-Mantle Melt Layers: Predictions and Observations of Hydrous Melting above the Transition Zone"
- Advisors: David Bercovici, Jeffrey Park, and Shun-ichiro Karato

M. Phil., Geophysics, May 2004.

University of Colorado, Boulder, CO USA

B.A., Physics, Mathematics, and French, May 2002.

- Honors Thesis Topic: "A seismic investigation of the Australian-Antarctic Discordance"
- Advisor: Michael H. Ritzwoller

Professional and Academic Experience

Woods Hole Oceanographic Institution, Woods Hole, MA USA

Postdoctoral Scholar **2008 - 2009**

Self-directed research developing new analytical methods for study of the oceanic lithosphere and reactive melt transport phenomena.

Yale University, New Haven, CT USA

Ph.D. Research **2002 - 2007**

Used a combination of numerical and analytical techniques to develop theoretical models to describe the dynamics of hydrous melting in the deep mantle, encompassing the conditions and process of melt generation, dynamic melt spreading and melt-solid chemical reactions, and recycling of melt into the deep mantle.

Teaching Fellow **2002 - 2005**

Was responsible for meeting with students outside of class and grading homework assignments (all courses), and grading exams (G&G 100, 2002). For G&G 100 (2002), I conducted twice weekly discussion sections about course material and homework. For G&G 100 (2005), I developed new tools for online submission and grading of coursework, and managed online course content.

- G&G 100 Natural Hazards, *Lead TA*, (Profs. David Bercovici and Mark Brandon), Fall 2005.
- G&G 456 Introduction to Seismology (Prof. Jeffrey Park), Spring 2004.
- G&G 100 Natural Hazards (Profs. Jay Ague and Mark Brandon), Fall 2002.

Honors and Awards

Woods Hole Oceanographic Institution Postdoctoral Scholar, 2008-2009.

Yale University, Philip M. Orville Prize for outstanding research and scholarship in the Earth Sciences, 2007.

Yale University, Estwing Hammer Prize for outstanding performance in Geology, 2006.

National Science Foundation Graduate Research Fellowship, 2004-2007.

Yale University, Bateman Fellowship, 2002-2007.

Yale University, Bateman Prize, 2002.

University of Colorado, graduated Magna Cum Laude, Honors in Physics, 2002.

Member of ΣΠΣ (Physics Honor Society).

National Science Foundation Research Experience for Undergraduates (REU) award, 2001.

Field Experience

Research Assistant, Science Crew

PLUME Cruise I - R/V Melville (Scripps Institute of Oceanography) **January 2005**
Assisted in the deployment of 35 ocean bottom seismometers and ocean-floor dredging surrounding the Hawaiian Islands.

PLUME Cruise II - R/V Ka imikai-o-kanaloa (University of Hawai'i) **January 2006**
Assisted in the recovery of 35 ocean bottom seismometers surrounding the Hawaiian Islands.

Professional Activities and Service

American Geophysical Union Member.

Session Convener, *Volatiles and Melts in the Earth's Interior*, AGU Fall Meeting 2007.

Falmouth Middle School Science Fair Project Advisor, 2008.

New Haven Science Fair Judge, 2005-2007.

Connecticut Pre-Engineering Program Mentor 2005-2006.

Invited Presentations

Carnegie Institute of Washington, D.C., February 2007.

Woods Hole Oceanographic Institution, January 2007.

Computer Skills

- Languages: Fortran 95/90/77, C/C++, PERL, HTML, CSS, Javascript, Unix scripts, GTK+.
- Applications: Generic Mapping Tools (GMT), Adobe Illustrator/Photoshop/Professional, Scilab, Mathematica, LaTeX, common Windows database, spreadsheet, and presentation software.
- Operating Systems: Unix/Linux, Windows.

Publications

ResearcherID: `http://www.researcherid.com/rid/B-1107-2008`

Leahy, G.M., and J.A. Collins, Improved statistical processing for common-conversion-point stacked receiver functions, *submitted to Bull. Seis. Soc. Am.*, 2008.

Leahy, G.M., and D. Bercovici, The dynamic spreading of hydrous melt above the 410-km discontinuity, *in preparation*, 2008.

Leahy, G.M., and D. Bercovici, The influence of diffusion-limited phase change reactions on the deformation of a viscous drop, *in preparation*, 2008.

Leahy, G.M., and J. Park, Evidence for a partially molten region above the 410 km mantle discontinuity in the Pacific, *in preparation*, 2008.

Leahy, G.M., and D. Bercovici, On the dynamics of a hydrous melt layer above the transition zone, *J. Geophys. Res., 112*, B07401, doi:10.1029/2006JB004631, 2007.

Karato, S., D. Bercovici, G.M. Leahy, G. Richard, and Z. Jing, Transition zone water-filter model for global material circulation: Where do we stand?, *Earth's Deep Water Cycle, AGU Monograph Series*, 168, edited by S.D. Jacobsen and S. van der Lee, 2006.

Leahy, G.M. and J. Park, Hunting for oceanic island Moho, *Geophys. Jour. Int.*, 160, 1020-1026, doi: 10.1111/j.1365-246X.2005.02562.x, 2005.

Leahy, G.M., and D. Bercovici, The influence of the transition zone water filter on convective circulation in the mantle, *Geophys. Res. Lett.*, 31, L23605, doi:10.1029/2004GL021206, 2004.

Leahy, G.M., and J. Park, Receiver Functions at Rarotonga, Cook Islands, *IRIS Annual Report,* 2003.

Ritzwoller, M.H., N.M. Shapiro, and G.M. Leahy, The Australian-Antarctic Mantle Anomaly as the principal cause of the Australian-Antarctic Discordance, *J. Geophys. Res., 108,* B12, 2559, doi:10.1029/2003JB002522, 2003.

Ritzwoller, M.H., N. Shapiro, A. Levshin, and G.M. Leahy, Crustal and upper mantle structure beneath Antarctica and surrounding oceans, *J. Geophys. Res., 106,* 30645-30670, 2001.

Recent Conference Presentations

Leahy, G.M., and D. Bercovici, Geodynamic modelling of volatile-rich mantle melts, *EOS, Trans. Amer. Geophys. Un., 88* (52), Fall Meet. Suppl. Abstract U13C-03, 2007.

Leahy, G.M., and D. Bercovici, Evolution of a hydrous silicate melt layer above the mantle transition zone , *EOS, Trans. Amer. Geophys. Un., 88* (52), Fall Meet. Suppl. Abstract DI33A-1128, 2007.

Leahy, G.M., and D. Bercovici, On the production and entrainment of hydrous silicate melts above the transition zone, *EOS, Trans. Amer. Geophys. Un., 87* (52), Fall Meet. Suppl. Abstract V53F-07, 2006.

Leahy, G.M., Melting at 410 km, *CIDER Workshop* UCSB, July 2006.

Leahy, G.M., and D. Bercovici, Structure and dynamics of a hydrous melt layer above the transition zone, *EOS, Trans. Amer. Geophys. Un., 86* (52) Fall Meet. Suppl. Abstract DI41A-1261, 2005.

Leahy, G.M., and D. Bercovici, Structure and dynamics of a hydrous melt layer above the transition zone, 9^{th} *European Conference on Numerical Modeling of Mantle Convection and Lithospheric Dynamics,* September 2005.

Leahy, G.M., and D. Bercovici, 2D Simulations of convection with heat production decoupled from bulk flow, *SEDI conference,* S7.5, July 2004.

Leahy, G.M., and J. Park, Hunting for oceanic Moho: The snipe bites back, *EOS, Trans. Amer. Geophys. Un., 84* (49), Fall Meet. Suppl. Abstract T41C-0225, 2003.

Ritzwoller, M.H., N.M. Shapiro, S. Zhong, W. Landuyt, and G.M. Leahy, Lithospheric thickness and sea floor topography inferred from a global seismic model, *EOS, Trans. Amer. Geophys. Un., 82* (47), Fall meeting, 2001.