

# Bradford J. Foley

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## Education

- 2014 Yale University, New Haven, CT  
Ph. D., Geology and Geophysics
- 2011 Yale University, New Haven, CT  
M. Phil., Geology and Geophysics
- 2008 University of Southern California, Los Angeles, CA  
B.S. *magna cum laude*, Geological Sciences

## Research and Professional Experience

- 2016-Present Assistant Professor, Department of Geosciences, Penn State University
- 2014-2016 Postdoctoral Associate, Department of Terrestrial Magnetism, Carnegie Institution for Science
- 2008-2014 Graduate Student, Department of Geology and Geophysics, Yale University, advisor: David Bercovici
- 2007-2008 Undergraduate Researcher, University of Southern California, supervised by Thorsten Becker

## Publications

- Foley, B. J. (2018), The dependence of planetary tectonics on mantle thermal state: Applications to early Earth evolution, *Philos. Trans. Royal Soc. A*, 376: 20170409, doi:10.1098/rsta.2017.0409.
- Foley, B. J. (2018), On the dynamics of coupled grain size evolution and shear heating in lithospheric shear zones, *Phys. Earth Planet. Int.*, 283, 7-25, doi:10.1016/j.pepi.2018.07.008.

- Foley, B. J.** and A. J. Smye (2018), Carbon cycling and habitability of Earth-size stagnant lid planets, *Astrobiology*, 18 (7), 873-896, doi:10.1089/ast.2017.1695
- Foley, B. J.** and H. Rizo (2017), Long-term preservation of early-formed mantle heterogeneity by mobile lid convection: Importance of grain-size evolution, *Earth Planet. Sci. Lett.*, 475, 94-105, doi:10.1016/j.epsl.2017.07.031.
- Lenardic, A., A. M. Jellinek, **B. J. Foley**, C. O'Neill, and W. B. Moore (2016), Climate-Tectonic Coupling: Variations in the Mean, Variations about the Mean, Variations in Mode, *J. Geophys. Res. Planets*, 121, doi:10.1002/2016JE005089.
- Foley, B. J.** and P. E. Driscoll (2016), Whole planet coupling between climate, mantle, and core: Implications for rocky planet evolution, *Geochem. Geophys. Geosyst.*, 17, 1885-1914, doi:10.1002/2015GC006210.
- Foley, B. J.**, (2015), The role of tectonic-climate coupling and exposed land area in the development of habitable climates on rocky planets, *Astrophys. J.*, 812, doi:10.1088/0004-637X/812/1/36
- Foley, B. J.**, D. Bercovici, and L.T. Elkins-Tanton (2014), Initiation of plate tectonics from post-magma ocean thermo-chemical convection, *J. Geophys. Res. Solid Earth*, 119, 1-24, doi:10.1002/2014JB011121.
- Foley, B.J.** and D. Bercovici (2014), Scaling laws for convection with temperature-dependent viscosity and grain-damage, *Geophys. J. Int.*, 199 (1): 580-603, doi:10.1093/gji/ggu275.
- Foley, B. J.**, D. Bercovici, and W. Landuyt (2012), The conditions for plate tectonics on super-Earths: Inferences from convection models with damage, *Earth Planet. Sci. Lett.*, 331-332, 281-290, doi:10.1016/j.epsl.2012.03.028.
- Foley, B. J.** and M. D. Long (2011), Upper and mid-mantle anisotropy beneath the Tonga slab, *Geophys. Res. Lett.*, 38, L02303, doi:10.1029/2010GL046021.
- Foley, B. J.** and T. W. Becker (2009), Generation of plate-like behavior and mantle heterogeneity from a spherical, viscoplastic convection model, *Geochem. Geophys. Geosyst.*, 10, Q08001, doi:10.1029/2009GC002378.

## Invited Talks

- October 2018      “Prospects for habitability of Earth-sized stagnant lid planets”  
University of Washington Astrobiology Seminar

- March 2018 “Constraints on early Earth tectonics from convection models with damage theory”  
Royal Society Discussion Meeting, “Earth dynamics and the development of plate tectonics”
- June 2017 “Controls on the tectonic evolution of terrestrial planets”  
Gordon Research Conference on The Origin of Solar Systems
- March 2017 “Early Earth Geodynamics: Insights from Convection Models with Grainsize Evolution”  
Rutgers University
- Dec 2016 “Weathering on a Stagnant Lid Planet: Prospects for Habitability?”  
AGU Fall meeting
- Sept 2016 “Early Earth Geodynamics: Insights from Convection Models with Grainsize Evolution”  
University of Maryland
- Dec 2015 “Whole Planet Coupling from Climate to Core: Implications for the Evolution of Rocky Planets and their Prospects for Habitability”  
AGU Fall meeting
- May 2015 “Long Mantle Mixing Times for the early Earth Inferred from Convection Models with Grain-Damage”  
AGU Spring meeting
- March 2015 “Initiation of Plate Tectonics and the Development of Habitable Climates on Rocky Planets”  
Penn State University
- July 2014 “Initiation of Plate Tectonics on the Early Earth: Insights from Numerical Convection Models”  
Department of Terrestrial Magnetism Seminar
- June 2014 “Coupling Between Climate and Tectonics via Plate Generation with Grain-Damage”  
Deep Carbon Cycle Modeling Workshop
- May 2014 “Generation of Plate Tectonics with Grain-Damage and Implications for Planetary Habitability”  
Dept. of Terrestrial Magnetism Astronomy Seminar

- April 2014 "Initiation of Plate Tectonics from Post-Magma Ocean Thermochemical Convection"  
University of Texas, Austin
- February 2014 "Initiation of Plate Tectonics from Post-Magma Ocean Thermochemical Convection"  
University of Houston
- April 2013 "Is Plate Tectonics Likely on Super-Earths? Inferences from Convection Models with Damage,"  
Scripps Institution for Oceanography, University of California San Diego
- March 2013 "Is Plate Tectonics Likely on Super-Earths? Inferences from Convection Models with Damage,"  
Department of Terrestrial Magnetism Seminar

## Awards

- 2013 Elias Loomis Prize for excellence in studies of physics of the Earth, Yale University
- 2012 AAAS/Science Program for Excellence in Science, Two year sponsored AAAS/Science membership
- 2011 Estwing Hammer Prize for outstanding geology graduate student, Yale University
- 2008 Estwing Hammer Prize for highest undergraduate GPA, USC
- 2008 2<sup>nd</sup> Place in USC undergraduate research symposium, physical sciences division

## Teaching Experience

- 2017-present GEOSC 497: Planetary Geophysics, GEOSC 203: Physical processes in the geosciences, EARTH 2: The Earth system and global change
- 2008-2012 Teaching Fellow for Yale University courses 'Natural Disasters', 'Introduction to Earth and Planetary Physics', and 'Geodynamics'
- 2013 Organizer and teacher for graduate student run course "Intro to concepts in Geology and Geophysics"

2013 Organizer for geophysics seminar on the early Earth

## Professional Affiliations

American Geophysical Union (since 2008), American Association for the Advancement of Science (since 2012, two year sponsored membership)

## Professional and University Service

2012-present Reviewer, *Geochem.*, *Geophys.*, *Geosyst.*, *Phys. Earth Planet. Int.*, *J. Geophys. Res.*, *J. Fluid Mech.*, *Progress Earth Planet. Sci.*, *Mon. Not. R. Astron. Soc.*, *Nature Astronomy*, *Astronomy & Astrophysics*, *Earth Planet. Sci. Lett.*, *Comptes Rendus Geoscience*, Proposals for NASA, NSF, Swiss NSF, German Research Foundation

2010 Treasurer for the Dana Club, Geology and Geophysics graduate student organization at Yale University