EDWARD J. GARNERO
CURRICULUM VITAE

CONTACT

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EDUCATION

1994 *Ph.D.,* California Institute of Technology, Geophysics
1986 *A.B,* University of California, Berkeley, Geophysics

EMPLOYMENT

Professor, Arizona State University, Tempe, AZ, Jul 2008-present
Associate Professor, Arizona State University, Tempe, AZ, May 2005-Jun 2008
Assistant Professor, Arizona State University, Tempe, AZ, Jan 1999-Apr 2005
Assistant Researcher, University of California, Berkeley, July 1997-Dec 1998
Postdoctoral Researcher, University of California, Santa Cruz, June 1996-July 1997
Visiting Associate in Geophysics, California Institute of Technology, June 1996-1997
Lecturer, University of California, Santa Cruz, Fall 1996
NSF Postdoctoral Researcher, University of Calif., Santa Cruz, June 1994-June 1996
Staff Seismologist, Woodward-Clyde Consultants, Oct 1989-Dec 1991

SELECTED FELLOWSHIPS / AWARDS

Fellow of the American Geophysical Union, 2010
ASU "Professor of the Year" nomination and runner up recipient, 2008
National Science Foundation, *CAREER Award*, Spring 2002-2007
IRIS/SSA Distinguished Lecturer, 2006
ASU "Faculty Exemplar" Citation, 2005
ASU "Last Lecture" Recipient, 2004.
ASU State Press Newspaper: "Favorite professor" citation (Multiple years)
National Science Foundation, *Postdoctoral Research Fellow*, June 1994-June 1996

PROFESSIONAL ACTIVITIES

Selected non-university service activities:
Gordon Research Conference co-Chair (2015) and Chair (2017)
NSF panelist, 2015-present
Co-Chair, IRIS Science Challenge Committee, Thermo-chemical Earth Interior, 2014-present
Committee Member, NSF Site Review of Computational Infrastructure for Geodynamics (CIG), 2013
Member, EOS Editorial Advisory Board, AGU, 2013-present
Advisor/Mentor, "Early Career Investigator" Committee, IRIS (Incorporated Research Institutions for Seismology), 2013-present
EarthScope National Office Leadership Team Member (2012-present)
Lecturer, CIDER Workshop, KITP Santa Barbara (2012)
Leadership Team Member, *EarthScope National Office*, ASU, 2011-present
Board Member, IRIS (Incorporated Research Institutions for Seismology), 2008–2011
Organizer, IRIS Workshop, 2010
IRIS Proposal Team Member/Writer, 2010

Advisory Council Member, Consortium for Materials Properties Research in Earth Sciences (COMPRES), 2008-2011
Committee Member, *Deep Earth Structure* EarthScope working group, 2008-2012
Committee Member, EarthScope's Transportable Array Working Group, 2007-2011
Advisory Board Member, Studies of Earth's Deep Interior, IUGG, 2007-present
Committee Member, IRIS Global Seismographic Network, 2005-2007
Chair, Study of Earth's Deep Interior AGU Focus Group, 2004- 2007
Associate Editor, Journal of Geophysical Research, 2001-2005
Committee Member, IRIS Data Management System Standing Committee, 2002-2004
Committee Member, Study of Earth's Deep Interior AGU focus group, 1999-2004
Seismology Chair, AGU Spring Meeting, 2000-2002
Proposal Reviewer, National Science Foundation (approx 5-10/yr)
Journal Paper Reviewer (approx 5-10/yr.)
Conference Special Session Organizer (e.g., AGU, approx 1/yr.)

Selected university service activities:
SESE Promotion & Tenure Committee 2014-present (chair, 2016-present)
University Promotion and Tenure Committee Member, 2011-2014
SESE Junior Faculty Mentor 2014-
SESE Personnel Committee, 2007-2010
SESE Undergraduate Advisor, 2000-2002, 2008–2010
SESE Awards Committee, 2006-2010
SESE New Faculty Search Committees, 2006-present
SESE Computing Committee, 2000-2008
CLAS Committee on Quality of Instruction, Spring 2007-2010
SESE development, Steering Committee Member, 2005

INVITED COLLOQUIA / DEPARTMENT SEMINARS

2015 University College of London
2015 University of Lyon, France
2014 University of California, Davis
2014 Arizona State University
2013 University of Arizona
2013 University of Nevada, Reno
2012 California Institue of Technology
2011 University of Southern California
2011 Southern Methodist University
2011 Carnegie Inst. Washington
2010 Arizona State University
2010 University of Münster
2009 Princeton
2009 California Institute of Technology
2008 University of Utah
2008 Lamont Doherty Earth Observatory
2008 Northern Arizona University
2007 State Univ. of New York, Stony Brook
2007 University of Washington
2007 Rice University
2007 University of Leeds
2007 University of Liverpool
2007 Inst. de Physique du Globe de Paris
2006 University of California, Los Angeles
2006 University of Texas, Austin
2006 Lawrence Livermore National Lab.
2006 University of California, Berkeley
2005 University of Southern California
2005 University of California, Santa Cruz
2005 Scripps Inst. of Oceanography, UCSD
2005 California Institute of Technology
2004 Yale University
2004 University of Texas at El Paso
2004 Arizona State University
2003 University of California, Berkeley
2003 University of California, Santa Cruz
2003 Inst. Nazion. di Geofisica e Vulc., Rome
2003 Massachusetts Institute of Technology
2003 New Mexico Inst.of Mining and Tech.
2002 University of Chicago
2002 University of Michican
2002 Ludwig-Maximilians-Univ., Munich
2000 ASU, Dept. of Math. and Statistics
1999 Scripps Inst.of Oceanography, UCSD
1999 University of Arizona

PUBLICATIONS *(In print only)*

102. Garnero, E. J., A.K. McNamara, and S.-H. D. Shim, Continent-sized low seismic velocity anomalies at the base of Earth's mantle, *Nature Geosci., 9*, 481–489 2016.
101. Williams, C.D., M. Li, A. K. McNamara, E.J. Garnero, and M.C. van Soest, Episodic entrainment of deep primordial mantle material into ocean island basalts, Nature Comm., 6., doi: 10.1038/ncomms9937, 2015.
100. Zhao, C., E. J. Garnero, A. K. McNamara, N. Schmerr, and R. W. Carlson, Seismic evidence for a chemically distinct thermochemical reservoir in Earth's deep mantle beneath Hawaii, *Earth Planet. Sci. Lett., 426,* 143-153, 2015.
99. Pommier, E., K. Leinenweber, D. L. Kohlstedt, C. Qi, E. J. Garnero, S.J. Mackwell, and J. A. Tyburczy, Experimental constraints on the electrical anisotropy of the lithosphere-asthenosphere system, *Nature, 522*, 202-205, 2015.
98. Pommier, A., Garnero, E. J., Petrology-based modeling of mantle melt electrical conductivity and joint interpretation of electromagnetic and seismic results, *J. Geophys. Res., 119,* 4001-4016, 2014.
97. Li, M. A.K. McNamara, and E.J. Garnero, Chemical complexit of hotspots caused by cycling oceanic crust through mantle reservoirs, *Nature Geosci., doi:10.1038/ngeo2120,* 2014.
96. Carlson, R.W., E. Garnero, T.M.Harrison, J. Li, M. Manga, W.F. McDonough, S. Mukhopadhyay, B. Romanowicz, D. Rubie, W. Williams, and S. Zhong, How did Early Earth Become our modern world?, *Ann. Rev. Earth. Planet. Sci., 42,* 151-178, 2014.
95. Thorne, M.S, E. J. Garnero, G.Jahnke, H. Igel, A.K. McNamara, Mega ultra low velocity zone and mantle flow, *Earth Planet. Sci. Lett., 364*, 59-67, 2013.
95. Nimmo, F., U. H. Faul and E. J. Garnero, Dissipation at tidal and seismic frequencies in a melt-free Moon, *J. Geophys. Res, Planets, 117,* E9, DOI: 10.1029/2012JE004160, 2012.
94. Ford, S.R., E. J. Garnero, and M.S. Thorne, Differential t* measurements via instantaneous frequency matching: observations of lower mantle shear attenuation heterogeneity beneath western Central America, *Geophys. J. Int., 189,* 513–523, 2012.
93. Weber, R. C. , P. Lin, E. J. Garnero, Q. Williams, and P. Lognonne, Seismic detection of the lunar core, *Science*, *331,* 309-312, 2011.
92. Garnero, E. J., A. K. McNamara, and J. Tyburczy, Structure of Earth's Lower Mantle, in *Encyclopedia of Solid Earth Geophysics*, Springer, Ed. Harsh Gupta, 154-159, 2011.
91. Lay, T., and E. J. Garnero, Deep mantle seismic modeling and imaging, *Ann. Rev. Earth Planet. Sci., 39,* 91-123, 2011.
90. Rost, S., E. J. Garnero, and W. Stefan, Thin and intermittent ultralow-velocity zones, *J. Geophys. Res., 115*, B06312, doi:10.1029/2009JB006981, 2010.
89. Rost, S., E. J. Garnero, M. S. Thorne, and A. R. Hutko, On the absence of an ultralow-velocity zone in the North Pacific, *J. Geophys. Res., 115*, B04312, doi:10.1029/2009JB006420, 2010.
88. Courtier, A. M., J. B. Gaherty, J. Revenaugh, M. G. Bostock, and E. J. Garnero, Seismic anisotropy associated with continental lithosphere accretion beneath the CANOE array, northwestern Canada, *Geology, 38,* 887-890, 2010.
87. McNamara, A. K., E. J. Garnero, and S. Rost, Tracking deep mantle reservoirs with ultra-low velocity zones, *Earth Planet. Sci. Lett., 299*, 1-9, 2009.
86. Lassak, T.M., A. K. McNamara, E. J. Garnero, and S. Zhong, Core–mantle boundary topography as a possible constraint on lower mantle chemistry and dynamics, *Earth Planet. Sci. Lett., 289*, 232-241, 2009.
85. Mercier, J.-P., M. G. Bostock, J. F. Cassidy, K. Dueker, J. B Gaherty, E. J. Garnero, J. Revenaugh, G. Zandt, Body-wave tomography of western Canada, *Tectonophysics, 475,* 480-492, 2009.

84. Marquardt, H., S. Speziale, H. J. Reichmann, D. J. Frost, F. R. Schilling, and E.J. Garnero, Unexpected elastic shear anisotropy of ferropericlase in Earth's lower mantle, *Science*, *324*, 224-226, 2009.
83. Schmerr, N., E.J. Garnero, and A. K. McNamara, Deep mantle plumes and convective upwelling beneath the Pacific Ocean, *Earth Planet. Sci. Lett., 294,* 143-151, 2009.
82. Hutko, A.R., Lay, T., J. Revenaugh, and E.J. Garnero, Anti-correlated Seismic Velocity Anomalies From Post-Perovskite in the Lowermost Mantle, *Science*, *320, 1070-1074,* 2008.
81. Garnero, E.J., and A. K. McNamara, Structure and dynamics of Earth's Lower Mantle, *Science*, *320*, 626-628, 2008.
80. Rost, S., E. J. Garnero, and Q. Williams, Seismic array detection of subducted oceanic crust in the lower mantle, *J. Geophys. Res*. 113, B06303, doi:10.1029/2007JB005263, 2008.
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77. Schmerr, N., and E. Garnero, Topography on Earth's upper mantle discontinuities from dynamically induced thermal and chemical heterogeneity, *Science*, *318*, 623-626, 2007.
76. Semken, S., M. Fouch, E. Garnero, P. Zah, D. Lippert, EarthScope's USArray Engages American Indian Stakeholders, *EOS Trans*., *88*, 309-310, 2007.
75. Kito, T., S. Rost, C. Thomas, and E. J. Garnero, Comparison of array methods for determination of laterally varying lowermost mantle P and S wave velocity discontinuity structure beneath the Cocos plate, *Geophys. J. Int., 169*, 631-645, 2007.
74. Garnero, E. J., T. Lay, and A. McNamara, Implications of lower mantle structural heterogeneity for existence and nature of whole mantle plumes, In: The Origin of Melting Anomalies: Plates, Plumes and Planetary Processes, Foulger, G. R., and D. M. Jurdy (eds.), The Geological Society of America Special Paper 430, p79-101, doi:10.1130/2007.2430(05), 2007.
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72. Garnero, E.J., and M.S. Thorne, Earth's ULVZ: Ultra-Low Velocity Zone, in *Encyclopedia of Geomagnetism and Paleomagnetism* (David Gubbins and Emilio Herrero-Bervera, Editors), Springer Publishing, The Netherlands, 970-973, 2007.
71. Garnero, E.J., M.S. Thorne, S. Rost, and A. McNamara, Fine-scale ultra-low velocity zone layering at the core-mantle boundary and superplumes, in *Superplumes: Beyond Plate Tectonics* (David A. Yuen, Shigenori Maruyama, Shun-ichiro Karato, and Brian F. Windley, Editors), pp. 139-157, Springer Publishing, The Netherlands, 2007.
70. Thorne, M.S., T. Lay, E.J. Garnero, G. Jahnke, and H. Igel, 3-D seismic imaging of the D" region beneath the Cocos Plate, *Geophys. J. Int*., doi: 10.1111/j.1365-246X.2006.03279.x, 1-14, 2007.
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67. Schmerr, N., and E.J. Garnero, Investigation of upper mantle discontinuity structure beneath the central Pacific using SS precursors, *J. Geophys. Res., 111*, B08305, doi:10.1029/2005JB004197, 2006.
66. Garnero, E. J., Interrogating the deep Earth with USArray, *IRIS Newsletter, Issue 3*, 6-7, 2006.

65. Rokosky, J.M., Lay, T., and E.J. Garnero, Small-scale lateral variations in azimuthally anisotropic D" structure beneath the Cocos Plate, *Earth Planet. Sci. Lett., 248*, 411-425, 2006.
64. Stefan, W., E.J. Garnero, and R. Renaut, Signal restoration through deconvolution applied to deep mantle seismic phases, *Geophys. J. Int., 167*, 1353-1362, 2006.
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57. Ford, S.R., E.J. Garnero, and A.K. McNamara, A strong lateral shear velocity gradient and anisotropy heterogeneity in the lowermost mantle beneath the southern Pacific, *J. Geophys. Res., 111,* B03306, doi:10.1029/2004JB003574. 2006.
56. Garnero, E.J., D. Loper, and B. Kennett, Studies of the Earth's Deep Interior - 8th Symposium, *Phys. Earth Planet. Int., 153*, 1-2, 2005.
55. Hung S.-H., E. J. Garnero, L.-Y. Chiao, B.-Y. Kuo, T. Lay, Finite frequency tomography of D" shear velocity heterogeneity beneath the Caribbean, *J. Geophys. Res., 110*, B07305, doi:10.1029/2004JB003373, 2005.
54. Maupin V., E. J. Garnero, T. Lay, M. J. Fouch, Azimuthal anisotropy in the D" layer beneath the Caribbean, *J. Geophys. Res., 110,* B08301, doi:10.1029/2004JB003506, 2005.
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51. Lay, T., E.J. Garnero, and S.A. Russell, Lateral Variation of the D" Discontinuity Beneath the Cocos Plate, *Geophys. Res. Lett.*, 31, doi:10.1029/2004GL020300, 2004.
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48. Garnero, E.J., Moore, M.M., Lay, T., and M. Fouch, Isotropy or weak vertical transverse isotropy in D" beneath the Atlantic Ocean, *J. Geophys. Res., 109*, doi:10.1029-2004JB003004, 2004.
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45. Lay, T. and Garnero, E.J., Core-mantle boundary structures and processes, in The State of the Planet: Frontiers and Challenges in Geophysics, edited by R.S.J. Sparks and C.J. Hawkesworth, Geophysical Monograph 150, IUGG Volume 19, doi:10.1029/150GM04, 2004.
44. Lay, T., Garnero, E.J., and Q. Williams, Partial melting in a thermo-chemical boundary layer at the base of the mantle, *Phys. Earth Planet. Int., 146,* 441-467, 2004.
43. Garnero, E.J., A new paradigm for Earth's core-mantle boundary, *Science, 304*, doi: 10.1126/science.1097849, 2004.
42. Rokosky, J.M., Lay, T., E.J. Garnero, and S.A. Russell, High resolution investigation of shear-wave anisotropy in D" beneath the Cocos Plate, *Geophys. Res. Lett., 31*, L07605, doi:10.1029/2003GL018902, 2004.
41. Moore, M.M., Garnero, E.J., T. Lay and Q. Williams, Shear wave splitting and waveform complexity for lowermost mantle structures with low-velocity lamellae and transverse isotropy, *J. Geophys. Res., 109*, doi:10.1029/2003JB002546, 2004.
40. Rost, S., and Garnero, E.J., A study of the uppermost inner core from PKKP and P'P' differential travel times, *Geophys. J. Int., 156*, 565-574, 2004.
39. Garnero, E.J., and T. Lay, D" Shear velocity heterogeneity, anisotropy and discontinuity structure beneath the Caribbean and Central America, *Phys. Earth Planet. Int., 140*, 219-242, 2003.
38. Garnero, E.J., The structure of Earth's dynamic deep mantle and core-mantle boundary region, *Global Tectonics and Metallogeny, 8*, 1-3, 2003.
37. Purucker, M., McCreadie, H., Vennerstrom, S., Hulot, G., Olsen, N., Luhr, H., and E. Garnero, Highlights from AGU's virtual session on "New Magnetic Field Satellites": Process and Science, *Eos Trans., AGU, 83*, 366, 2002.
36. Garnero, E.J., Ultralow-velocity zones (seismology), McGraw Hill 2002 Yearbook of Science and Technology, 400-403, 2001.
35. Buffett, B., Garnero, E.J., and R. Jeanloz, Porous sediments at the top of Earth's core? Response, *Science, 291*, 2092-2093, 2001.
34. Buffett, B.A., Garnero, E.J., and R. Jeanloz, Sediments at the top of the Earth's core, *Science, 290*, 1338-1342, 2000.
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32. Garnero, E.J., and R. Jeanloz, Fuzzy patches on the Earth's core-mantle boundary?, *Geophys. Res. Lett., 27*, 2777-2780, 2000.
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29. Garnero, E.J., and M.E. Wysession, What on Earth is D"?, *Eos Trans., AGU, 81*, 501, 2000.
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27. Garnero, E.J., and J. Vidale, ScP; a probe of ultralow-velocity zones at the base of the mantle, *Geophys. Res. Lett., 26*, 377-380, 1999.
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25. Garnero, E.J., J.S. Revenaugh, Q. Williams, T. Lay, and L.H. Kellogg, Ultralow velocity zone at the core-mantle boundary, in The Core-Mantle Boundary Region, eds. M. Gurnis, M. Wysession, E. Knittle, and B. Buffett, pp. 319-334, AGU, Washington, D.C., U.S.A., 1998.
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22. Lay, T., Q. Williams, and E.J. Garnero, The core-mantle boundary layer and deep earth dynamics, *Nature, 392*, 461-468, 1998.
21. Ritsema, J.E., T. Lay, E.J. Garnero, and H. Benz, Seismic anisotropy in the lowermost mantle beneath the Pacific, *Geophys. Res. Lett., 25*, 1229-1232, 1998.
20. Russell, S., T. Lay, and E.J. Garnero, Seismic evidence for small-scale dynamics in the lowermost mantle at the root of the Hawaiian hotspot, *Nature, 369,* 255-257, 1998.
19. Williams, Q., J.S. Revenaugh, E.J. Garnero, A correlation between ultra-low basal velocities in the mantle and hot spots, *Science*, *281,* 546-549, 1998.
18. Garnero, E.J., and D.V. Helmberger, Further structural constraints and uncertainties of a thin laterally varying ultra-low velocity layer at the base of the mantle, *J. Geophys. Res., 103*, 12,495-12,509, 1998.
17. Ritsema, J.E., E.J. Garnero, and T. Lay, A strongly negative shear velocity gradient and lateral variability in the lowermost mantle beneath the Pacific, *J. Geophys. Res., 102*, 20,395-20,411, 1997.
16. Lay, T., E.J. Garnero, C.J. Young, and J.B. Gaherty, Scale-lengths of heterogeneity at the base of the mantle from S-wave differential times, *J. Geophys. Res., 102*, 9,887-9,909, 1997.
15. Garnero, E.J., and T. Lay, Lateral variations in lowermost mantle shear wave anisotropy beneath the north Pacific and Alaska, *J. Geophys. Res., 102,* 8121-8135, 1997.
14. Garnero, E.J., and D.V. Helmberger, Seismic detection of a thin laterally varying boundary layer at the base of the mantle beneath the central-Pacific, *Geophys. Res. Lett., 23,* 977-980, 1996.
13. Williams, Q., and E.J. Garnero, Seismic evidence for partial melt at the base of Earth's mantle, *Science, 273*, 1528-1530, 1996.
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11. Helmberger, D.V., L.-S. Zhao, and E.J. Garnero, Construction of synthetics for 2D structures, core phases, in Proceedings of International School of Solid Earth Geophysics: Seismic Modeling of the Earth's Structure, Soc. Italiana di Fisica, Eds: E. Boschi, G. Ekstrom, 183-222, 1996.
10. Garnero, E.J., and D.V. Helmberger, A very slow basal layer underlying large-scale low-velocity anomalies in the lower mantle beneath the Pacific: evidence from core phases, *Phys. Earth Planet. Int., 91*, 161-176, 1995.
9. Garnero, E.J., and D.V. Helmberger, On seismic resolution of lateral heterogeneity in the Earth's outermost core, *Phys. Earth Planet. Int., 88,* 117-130, 1995.
8. Garnero, E.J., Seismic structure above and below the core-mantle boundary, Ph.D. Thesis, California Institute of Technology, 1994.
7. Garnero, E.J., D.V. Helmberger, and S.P. Grand, Constraining outermost core velocity with SmKS waves, *Geophys. Res. Lett., 20,* 2463-2466, 1993.
6. Garnero, E.J., S.P. Grand, and D.V. Helmberger, Low P-wave velocity at the base of the mantle, *Geophys. Res. Lett., 20,* 1843-1846, 1993.
5. Garnero, E.J., D.V. Helmberger, and S.P. Grand, Preliminary evidence for a lower mantle shear wave velocity discontinuity beneath the central Pacific, *Phys. Earth Planet. Int., 79,* 335-347, 1993.
4. Garnero, E.J., and D.V. Helmberger, Travel times of S and SKS: Implications for three-dimensional lower mantle structure beneath the central Pacific, *J. Geophys. Res., 98,* 8225-8241, 1993.

3. Garnero, E.J., D.V. Helmberger, and L.J. Burdick, Preliminary observations from the use of US-Soviet Joint Seismic Program data to model upper mantle triplications beneath Asia, *Geophys. J. Int., 113,* 252-259, 1992.
2. Helmberger, D.V., P.G. Somerville, and E.J. Garnero, The location and source parameters of the Lompoc, California, earthquake of 4 November 1927, *Bull. Seism. Soc. Am., 82*, 1678-1709, 1992.
1. Garnero, E.J., D.V. Helmberger, and G. Engen, Lateral variations near the core-mantle boundary, *Geophys. Res. Lett., 15*, 609-612, 1988.