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### **Education**

- 1999-2003 Ph.D., Geophysics  
University of California, Berkeley  
Thesis advisor: Raymond Jeanloz  
Thesis: Exploring planetary interiors: Experiments at extreme conditions
- 1995-1999 BS, Physics, *Cum Laude*  
University of San Francisco

### **Appointments**

- July 2008 - present Assistant Professor  
Department of Geology & Geophysics  
Yale University
- January 2006 - June 2008 Assistant Professor  
Department of Physics  
New Mexico State University
- January 2004 - December 2005 O. K. Earl Postdoctoral Fellow  
Division of Geological and Planetary Sciences  
California Institute of Technology

### **Selected Awards and Honors**

- 2010 University of San Francisco's Arthur Furst Award for Outstanding Research  
Advancing Science for the Betterment of Humanity
- 2005-2008 Alexander von Humboldt Summer Fellow, Bayerisches Geoinstitut
- 2004-2005 O. K. Earl Postdoctoral Fellow, California Institute of Technology
- 2000-2003 National Science Foundation Graduate Research Fellow

### **Selected Proposals Funded**

- 2013-2015 NSF: "Experimental studies on melting (Mg, Fe)O ferropericlasite"
- 2010-2015 NSF: "CAREER: Chemical Heterogeneity in Earth's Lower Mantle"
- 2006-present Carnegie/DOE Alliance Center: "Pressure- and chemistry-dependent electron-capture radioactive decay," 2006-2008; "High-pressure investigation of transition-metal oxides," 2009-2010; "High-pressure melting of dense potassium," 2010;

“Structure and strength of cold-compressed graphite,” 2011; “Homogeneous starting materials for high-pressure experiments,” 2012.

### Teaching Experience

- 2012-present G&G 319/519: Intro. to the Physics and Chemistry of Earth Materials (Fall)  
2010-present G&G 207: The Science of Water (Spring)  
2009 G&G 744: Seminar in Mantle and Core Processes (Fall)  
2009 G&G 326/526: Introduction to Earth & Planetary Physics (Spring & Fall)  
2006-2008 PHYS 213: Mechanics, Asst. Professor, NMSU  
PHYS 214: Introduction to Electricity & Magnetism, Asst. Professor, NMSU  
PHYS 305G: The Search for Water in the Solar System, Asst. Professor, NMSU  
PHYS 451: Intermediate Mechanics, Asst. Professor, NMSU  
1996-2003 Exploratorium ([www.exploratorium.edu](http://www.exploratorium.edu)) “Physics of Toys” volunteer.

### Publications (\* undergraduate advisee, ^ graduate student advisee, and # postdoc advisee)

29. Y. Al-Khatatbeh and K. K. M. Lee, “From superhard to hard: A review of transition metal dioxides TiO<sub>2</sub>, ZrO<sub>2</sub> and HfO<sub>2</sub> hardness,” *in preparation*, *INVITED review, Journal of Superhard Materials*, (2013).
28. K. Glazyrin<sup>#</sup> and K. K. M. Lee, “From enstatite chondrites to the Earth’s lower mantle: A mineral physics perspective,” *in preparation*, (2013).
27. K. Glazyrin<sup>#</sup>, N. Miyajima, J. Smith and K. K. M. Lee, “Stress- and pressure-induced iron spin state crossover in lower mantle minerals,” *in preparation*, (2013).
26. I. Uts<sup>\*</sup>, K. Glazyrin<sup>#</sup> and K. K. M. Lee, “Effect of Laser Annealing of Common Solid Pressure Media on Pressure Gradients in a Diamond-Anvil Cell,” *under review in Review of Scientific Instruments*, (2013).
25. T. Duffy, N. Madhusudhan and K. K. M. Lee, “Mineralogy of Super-Earth Planets,” *under review in Treatise of Geophysics*, (2013).
24. Z. Du<sup>^</sup>, G. Amulele, L. R. Benedetti and K. K. M. Lee, “Mapping Temperatures and Temperature Gradients during Flash Heating in a Diamond-Anvil Cell,” *Review of Scientific Instruments*, 84, 075111 (2013).
23. Z. Du<sup>^</sup>, L. Miyagi<sup>#</sup>, G. Amulele and K. K. M. Lee, “External resistively-heated diamond-anvil cell to temperatures up to 1300 K,” *Review of Scientific Instruments*, 84, 024502 (2013).
22. N. Madhusudhan<sup>#</sup>, K. K. M. Lee and O. Mousis, “Evidence for a Carbon-rich Interior in Super-Earth 55 Cancri e,” *Astrophysical Journal Letters*, 759: L1 (2012).
21. Y. Al-Khatatbeh<sup>#</sup>, K. K. M. Lee and B. Kiefer, “Compressibility of nanocrystalline TiO<sub>2</sub> anatase,” *Journal of Physical Chemistry C*, 116, 21635 (2012).

20. Y. Wang<sup>#</sup> and K. K. M. Lee, “From Soft to Superhard: Fifty years of experiments on cold-compressed graphite,” *Journal of Superhard Materials*, 34(6), 25-39 (2012).
19. Y. Wang<sup>#</sup>, J. E. Panzik<sup>^</sup>, B. Kiefer and K. K. M. Lee, “Crystal structure of graphite under room-temperature compression and decompression,” *Scientific Reports*, 2, 520 (2012).
18. J. M. Montgomery<sup>^</sup>, B. Kiefer and K. K. M. Lee, “Determining the phase transition boundary in highly-ordered pyrolytic graphite with time-dependent resistance measurements,” *Journal of Applied Physics*, 110, 047325 (2011).
17. L. Miyagi<sup>#</sup>, W. Kanitpanyacharoen, P. Kaercher, K. K. M. Lee, H.-R. Wenk, “Slip Systems in MgSiO<sub>3</sub> Post-Perovskite: Implications for D” Anisotropy,” *Science*, 329, 1639 (2010).
16. Y. Al-Khatatbeh<sup>^</sup>, K. K. M. Lee and B. Kiefer, “Phase diagram up to 105 GPa and mechanical strength of HfO<sub>2</sub>,” *Physical Review B*, 82, 144106 (2010).
15. Y. Al-Khatatbeh<sup>^</sup>, K. K. M. Lee and B. Kiefer, “Phase relations and hardness trends of ZrO<sub>2</sub> phases at high pressure,” *Physical Review B*, 81, 214102 (2010).
14. K. K. M. Lee, “The Enigma of D,” *Nature*, 462, 731 (2009).
13. K. K. M. Lee and G. Steinle-Neumann, “Ab-initio predictions of potassium partitioning between Fe and Al-bearing MgSiO<sub>3</sub> perovskite and post-perovskite,” *Physics of the Earth and Planetary Interiors*, 174, 247-253 (2009).
12. Y. Al-Khatatbeh<sup>^</sup>, K. K. M. Lee and B. Kiefer, “High-pressure behavior of TiO<sub>2</sub> as determined by experiment and theory,” *Physical Review B*, 79, 134114 (2009).
11. K. K. M. Lee and G. Steinle-Neumann, “Ab-initio study of the effects of pressure and chemistry on the electron-capture radioactive decay constants of <sup>7</sup>Be, <sup>22</sup>Na and <sup>40</sup>K,” *Earth & Planetary Science Letters*, 267, 628-636 (2008).
10. R. Jeanloz, P. M. Celliers, G. W. Collins, J. H. Eggert, K. K. M. Lee, R. S. McWilliams, S. Brygoo, P. Loubeyre, “Achieving novel states through shock-wave loading of pre-compressed samples,” *Proceedings of the National Academy of Sciences*, doi/10.1073/pnas.0608170104 (2007).
9. K. K. M. Lee, L. R. Benedetti, R. Jeanloz, P. M. Celliers, J. H. Eggert, D. G. Hicks, S. J. Moon, A. Mackinnon, L. B. DaSilva, D. K. Bradley, W. Unites, G. W. Collins, E. Henry, M. Koenig, A. Benuzzi-Mounaix, J. Pasley, D. Neely, “Forming conducting water: Implications for magnetic field generation in Icy Giant planets,” *Journal of Chemical Physics*, 125, 014701, doi: 10.1063/1.2207618 (2006).
8. K. K. M. Lee and G. Steinle-Neumann, “High-pressure alloying of iron and xenon: ‘Missing’ Xe in the Earth’s Core,” *Journal of Geophysical Research: Solid Earth*, 111, B02202, doi:10.1029/2005JB003781 (2006).

7. K. K. M. Lee, B. O'Neill, W. R. Panero, S.-H. Shim, L. R. Benedetti and R. Jeanloz, "Equations of state of the high-pressure phases of a natural peridotite and implications for the Earth's Lower Mantle," *Earth & Planetary Science Letters*, 223(3-4), 381-393, (2004).
6. K. K. M. Lee, B. O'Neill, R. Jeanloz, "Limits to resolution in composition and density in ultra high-pressure experiments on natural mantle-rock samples," *Physics of the Earth and Planetary Interiors*, 143-144, 241 (2004).
5. K. K. M. Lee, G. Steinle-Neumann and R. Jeanloz, "Ab-initio high-pressure alloying of iron and potassium: Implications for the Earth's Core," *Geophysical Research Letters*, 31(11), L11603 (2004).
4. P. Loubeyre, P. M. Celliers, D. G. Hicks, E. Henry, A. Dewaele, J. Pasley, J. H. Eggert, M. Koenig, F. Occelli, K. K. M. Lee, R. Jeanloz, D. Neely, A. Benuzzi-Mounaix, D. Bradley, M. Bastea, S. Moon and G.W. Collins, "Coupling static and dynamic compressions: First measurements in dense hydrogen," *High Pressure Research*, 24(1), 25 (2004).
3. P. M. Celliers, G. W. Collins, D. G. Hicks, M. Koenig, E. Henry, A. Benuzzi-Mounaix, D. Batani, D. K. Bradley, L. B. DaSilva, R. J. Wallace, S. J. Moon, J. H. Eggert, K. K. M. Lee, L. R. Benedetti, R. Jeanloz, I. Masclet, N. Dague, B. Marchet, M. Rabec Le Gloahec, Ch. Reverdin, J. Pasley, O. Willi, D. Neely and C. Danson, "Electronic conduction in shock-compressed water," *Physics of Plasmas*, 11(8), L41 (2004).
2. K. K. M. Lee and R. Jeanloz, "High-pressure alloying of potassium and iron: Radioactivity in the Earth's Core?" *Geophysical Research Letters*, 30(23), 2212 (2003).
1. K. K. M. Lee, L. R. Benedetti, A. Mackinnon, D. Hicks, S. J. Moon, P. Loubeyre, F. Occelli, A. Dewaele, G. W. Collins, and R. Jeanloz, "Taking thin diamonds to their limit: Coupling static-compression and laser-shock techniques to generate dense water," *AIP Conference Proceedings* 620, 1363 (2002).

### **Community Outreach**

Currently, my volunteer work extends locally, regionally and nationally. Locally, I mentor middle school students' science fair projects as well as judge high school science fair projects for the New Haven Science Fair. I have also been the resident scientist in the "Ask-A-Scientist" portion of the Girls' Science Investigations Program put on by the Yale Department of Physics. I also participate in the "Adopt-A-Physicist" Program (sponsored by AIP), an online forum where high school classes from across the nation 'adopt' me and ask me questions regarding their own scientific interests.

As part of a recent endeavor funded through my NSF CAREER grant, I, in conjunction with illustrator Adam Wallenta, have written and produced the first of two Earth science comic books used in the New Haven Public Schools system. The first is entitled, "The Adventures of GEO: Plate Tectonics" and was published in November 2012 ([www.adventuresofgeo.com](http://www.adventuresofgeo.com)).