

Matthew L. Whitaker
Research Assistant Professor / Beamline Scientist; Mineral Physics Institute

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| Mineral Physics Institute Stony Brook University Earth & Space Sciences Room 132 Stony Brook, NY 11794-2100 Office Phone: (631) 632-9351 Office FAX: (631) 632-8140 SBU E-Mail: matthew.whitaker@stonybrook.edu | National Synchrotron Light Source II Bldg. 741, C08Q Brookhaven National Laboratory Upton, NY 11973 Office Phone: (631) 344-4066 Beamline Phone: (631) 344-3704 BNL E-Mail: mwhitaker@bnl.gov |
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| Date of Birth: August 25, 1979 Citizenship: United States | Birthplace: Kingston, NY U.S.A. Family Status: Married w/ 3 Children |
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CURRENT POSITIONS:

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| Research Assistant Professor in Mineral Physics Institute, Stony Brook University | July 2011 – Present |
| Beamline Scientist for XPD-D at National Synchrotron Light Source II | January 2015 – Present |
| Beamline Scientist for 6-BM-B at Advanced Photon Source | June 2014 – Present |
| Research Assistant Professor in Department of Geosciences, Stony Brook University | January 2015 – August 2018 |

EDUCATION:

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| Ph.D. in Geosciences – Stony Brook University; Concentration in Mineral Physics, Geochemistry Doctoral Dissertation Advisor: Dr. Baosheng Li Final Grade Point Average: 4.0 | August 2009 |
| B.S. in Geological Sciences w/ Honors, Chemistry Minor – State University of New York at New Paltz Undergraduate Advisor: Dr. Constantine Manos Final Grade Point Average: 3.49 | May 2002 |
| New York State Regents Diploma w/ Honors – Kingston High School; Kingston, NY | June 1997 |

EMPLOYMENT HISTORY:

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| Beamline Scientist, X17MAC Multi-Anvil Facility, Nat'l Synchrotron Light Source | July 2011 – December 2014 |
| Visiting Assistant Professor in Mineral Physics Institute, Stony Brook University | July 2010 – July 2013 |
| Assistant Professor / 助教 in Department of Earth Sciences, Ehime University | April 2010 – June 2011 |
| GCOE Post-Doctoral Fellow in Geodynamics Research Center, Ehime University | September 2009 – March 2010 |

STUDENTS ADVISED:

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| Research Assistant Professor – Mineral Physics Institute / Department of Geosciences, Stony Brook University: | |
| ❖ Eric Quackenbush, Undergraduate Student (Physics/Mathematics) | Fall 2014 – Present |
| ❖ Naveen Dharmagunawardhane, Ph.D. Student (co-advisor w/ Prof. John B. Parise) | Sp. 2012 – Spring 2017 |
| ❖ Matthew Bernstein, Monroe-Woodbury High School Student | Summer 2015 – Spring 2016 |
| Assistant Professor – Geodynamics Research Center / Department of Earth Sciences, Ehime University: | |
| ❖ Yongtao Zou, Ph.D. Student (co-advised by Prof. Tetsuo Irifune) | Spring 2010 – Fall 2012 |
| ❖ Chunyin Zhou, Ph.D. Student (co-advisor with Prof. Norimasa Nishiyama) | Spring 2011 |
| Graduate Student – Undergraduate Research Mentor, Department of Geosciences, Stony Brook University: | |
| ❖ Samuel Pottish, CSU Long Beach (Mineral Physics Institute REU) | Summer 2008 |
| ❖ Jan Kubicek, Stony Brook University (Department Research & REU) | June 2004 – May 2005 |
| ❖ Nicholas DiFrancesco, Stony Brook University (REU & Department Research) | July 2002 – May 2004 |
| ❖ Bryan Bochiccio, Stony Brook University (Department Research) | Summer 2003 |
| ❖ Gretchen Miles, Alfred University (Stony Brook University REU) | Summer 2003 |
| ❖ Harris Mason, Marietta College (Mineral Physics Institute REU) | Summer 2003 |
| ❖ Jenny Gast, Idaho State University (Mineral Physics Institute REU) | Summer 2002 |

TEACHING EXPERIENCE:

Stony Brook University Research Assistant Professor:

- ❖ GEO 487 – Senior Research in Geology Fall 2015, 2016
- ❖ GEO 287 – Introductory Research in Geology Spring 2015, 2016, 2017
- ❖ University of Nevada Las Vegas Mineral Physics 101 Course Guest Lecturer Fall 2013

Ehime University Assistant Professor:

- ❖ Earth Science Concepts in English (Undergraduate Physical Geology) Spring 2011
- ❖ GCOE International Special Course: "Geoscience Communication and Oration in English" Spring 2011
- ❖ "Topics in Geosciences and Beyond" Graduate Seminar Course Spring 2011
- ❖ GCOE International Special Course: "Geoscience Communication and Oration in English" Fall 2010
- ❖ "Topics in Geosciences and Beyond" Graduate Seminar Course Fall 2010
- ❖ GCOE International Special Course: "Geoscience Communication and Oration in English" Spring 2010

Stony Brook University Graduate Teaching Assistant:

- ❖ GEO 407/507 – Mineralogy-Petrology II w/ Dr. Hanna Nekvasil Fall 2005
- ❖ GEO 102 – Physical Geology w/ Dr. Hanna Nekvasil Spring 2005
- ❖ GEO 306 – Mineralogy-Petrology I w/ Dr. Brian Phillips Spring 2003
- ❖ GEO 111 – Environmental Geology Laboratory w/ Dr. Gilbert Hanson Fall 2002

State University of New York at New Paltz Undergraduate Teaching Assistant:

- ❖ GEO 50100 – Planet Earth w/ Dr. Constantine Manos Spring 2001 – Spring 2002
- ❖ GEO 50220 – Physical Geology w/ Dr. Constantine Manos Fall 2001
- ❖ GEO 50311 – Mineralogy and Crystallography w/ Dr. Martin Rutstein Fall 2001

TECHNICAL EXPERIENCE AND SKILLS:

- ❖ Synchrotron X-Ray Techniques (Powder Diffraction, X-radiographic Imaging, Inelastic X-ray Scattering)
- ❖ High Pressure Experimental Techniques (Piston-Cylinder, Multi-Anvil Apparatus, Diamond Anvil Cell)
- ❖ Ultrasonic Interferometry for Acoustic Velocity Measurement
- ❖ Various Low-Pressure Furnace Designs for Experiments and Sample Synthesis
- ❖ Controlled fO₂ Experiments Using Gas-Mixing Furnace
- ❖ X-Ray Powder Diffraction and Micro-Diffraction
- ❖ Electron Microprobe and Scanning Electron Microscopy (Standard and Field Emission)
- ❖ Petrographic Microscopy (reflected and polarized light)
- ❖ Analytical Transmission Electron Microscopy
- ❖ Theoretical First-Principles Calculations Using PWSCF *ab initio* Software Package
- ❖ Extensive sample synthesis and preparation experience with several techniques
- ❖ Extensive experience designing and machining experimental materials, parts, and cell assemblies
- ❖ Some solid-state Nuclear Magnetic Resonance Spectroscopy experience
- ❖ Proficient in coding HTML and some minor Javascript and Flash for web content
- ❖ Experienced in building custom computer workstations and servers

RESEARCH INTERESTS:

Mineral Physics

- ❖ Determination of physical properties of materials at high pressure and temperature
- ❖ Investigation of iron/light-element alloys, mantle minerals, and novel materials under extreme conditions
- ❖ Combined Ultrasonic Interferometry and Synchrotron X-Radiation Techniques in Multi-Anvil Apparatus
- ❖ Elastic wave velocity measurements and Equation of State studies of minerals, metals, and novel materials
- ❖ High pressure studies using Diamond Anvil Cells and Synchrotron X-Radiation
- ❖ Reconciling differences in experimental results obtained using different techniques
- ❖ High pressure and high temperature synthesis of novel and Earth materials

Experimental Geochemistry/Petrology

- ❖ Phase equilibria in melts as a function of pressure, temperature, and volatile content
- ❖ Residual liquid evolution during liquid differentiation; from basalt to rhyolite
- ❖ Investigating petrogenetic relationships between rock types found in common intraplate magmatic suites

Planetary Science

- ❖ Investigation of candidate constituents of terrestrial planetary cores
- ❖ Comparison of experimental results with geochemical constraints on planetary composition
- ❖ Developing new experimental techniques aimed at reproducing metastable conditions similar to impacts
- ❖ Using terrestrial magmatism as a potential analog for igneous diversity on other terrestrial planetary bodies
- ❖ Experimental and analytical geochemical studies of martian meteorites (specifically Yamato 980459)

NATIONAL LABORATORY AND SYNCHROTRON FACILITIES EXPERIENCE:

Advanced Photon Source (APS) at Argonne National Laboratory (ANL), USA

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| Beamline 6-BM-B: Beamline for Multi-Anvil High Pressure Research (<i>Beamline Scientist</i>) | 2014 – Present |
| Beamline 11-ID-B: High Energy X-Ray Diffraction and Pair Distribution Function (<i>User</i>) | 2017 – Present |
| GSECARS Beamline 13-ID-D: X-Ray Diffraction, X-Radiographic Imaging, and Ultrasonic Interferometry at High Pressure and Temperature in Large Volume Multi-Anvil Apparatus (<i>User</i>) | October 2007 – Present |

National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory (BNL), USA

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| Beamline X17B2: X-Ray Diffraction, X-Radiographic Imaging, Synthesis, Deformation, and Ultrasonic Interferometry at High Pressure and Temperature in Large Volume Multi-Anvil Apparatus (<i>Beamline Scientist, User & Principal Investigator</i>) | 2007 – 2014 |
| Beamline X17B2ss: X-Ray Diffraction, X-Radiographic Imaging, and Deformation at High Pressure and Temperature in Multi-Anvil Apparatus (<i>Beamline Scientist, User & Principal Investigator</i>) | 2011 – 2014 |
| Beamline X17B3: X-Ray Diffraction in Diamond Anvil Cells (<i>User & Principal Investigator</i>) | 2013 – 2014 |
| Beamline X17C: X-Ray Diffraction in Diamond Anvil Cells (<i>User & Principal Investigator</i>) | 2008 – 2014 |
| Beamline X26A: Hard X-Ray Microprobe and Fe-XANES (<i>User</i>) | 2002 – 2003 |

National Synchrotron Light Source II (NSLS-II) at Brookhaven National Laboratory (BNL), USA

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| Beamline XPD-D: Beamline for Multi-Anvil High Pressure Research (<i>Lead Beamline Scientist</i>) | 2014 – Present |
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SPring-8 (Super Photon Ring – 8 GeV) in Hyogo, Japan

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| Beamline BL04B1: X-Ray Diffraction, X-Radiographic Imaging, and Ultrasonic Interferometry at High P and T in Large Volume Multi-Anvil Apparatus (<i>User & Principal Investigator</i>) | November 2009 – Present |
| Beamline BL10XU: Diamond Raman Spectroscopic Pressure Measurement and X-ray Diffraction in Diamond Anvil Cells (<i>User & Co-Investigator</i>) | February 2010 – Present |
| Beamline BL12XU: Inelastic X-ray Scattering in Diamond Anvil Cell (<i>User & Co-I</i>) | February 2010 – Present |

HONORS, AWARDS, AND FELLOWSHIPS:

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| Global Center of Excellence Post-Doctoral Fellowship | September 2009 – March 2010 |
| COMPRES Student Travel Scholarship (\$500) | June 2009 |
| American Geophysical Union Best Student Paper Award (link) | Fall Meeting, December 2008 |
| GAANN Fellowship, U.S. Department of Education | 2008 – 2009 |
| Gordon Conference Chair's Fund, Meeting Defrayment (\$440) | July 2008 |
| COMPRES Student Travel Scholarship (\$500) | June 2008 |
| GAANN Fellowship, U.S. Department of Education | 2006 – 2007 |
| Outstanding Teaching Assistant, Department of Geosciences, Stony Brook University | May 2005 |
| GAANN Fellowship, U.S. Department of Education | Fall 2003 |
| Excellence in Teaching, Department of Geosciences, Stony Brook University | May 2003 |
| GAANN Fellowship, U.S. Department of Education | Spring 2003 |

PROFESSIONAL AFFILIATIONS:

- ❖ American Geophysical Union (2002 – Present)
- ❖ COMPRES: COnsortium for Materials Properties Research in Earth Sciences (2007 – Present)
- ❖ Mineralogical Society of America (2002 – Present)
- ❖ Sigma Xi (2014 – Present)
- ❖ Geochemical Society (2002 – 2006)
- ❖ Geological Society of America (2002 – 2005)
- ❖ Japan Geoscience Union (2010 – 2012)
- ❖ Meteoritical Society (2005 – 2007)

INVITED TALKS, COLLOQUIA & PUBLIC LECTURES:

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| ❖ Monroe Woodbury High School Scientific Research Symposium (Keynote) | May 19, 2016 |
| ❖ Monash University School of Geosciences, Melbourne, Victoria, Australia | February 27, 2014 |
| ❖ United States Naval Research Laboratory, Washington D.C. | November 11, 2013 |
| ❖ Invited Talk at American Geophysical Union Fall Meeting 2011 (see Abstracts) | December 9, 2011 |
| ❖ Matsuyama Minami High School Super Science Program | February 2, 2011 |
| ❖ High School Preparatory Science Introductory Study Lecture | January 26, 2011 |
| ❖ Matsuyama Minami High School Super Science Program | February 9, 2010 |
| ❖ COMPRES 2009 Annual Meeting – Student Highlight Talk | June 20, 2009 |
| ❖ Global Center of Excellence, Geodynamics Research Center, Ehime University | April 27, 2009 |
| ❖ National Synchrotron Light Source Seminar Series | August 8, 2008 |

PROFESSIONAL SERVICE:

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| COMPRES Multi-Anvil High Pressure Program Co-Principal Investigator | January 2017 – Present |
| National Synchrotron Light Source II Beamline XPD-D Development Team – Lead Scientist | June 2014 – Present |
| Advanced Photon Source Beamline 6-BM-B Development Team – Lead Scientist | May 2013 – December 2016 |
| COMPRES Experimental Cell Assembly Development Project Member | 2012 – Present |
| COMPRES <i>ad hoc</i> Education Committee | July 2012 – June 2013 |
| COMPRES International Experiences Workshop Panelist | June 2011 |
| Principal Convener and Session Chair – "Structure, Dynamics and Composition of Earth and Planetary Cores" | |
| International Session at Japan Geosciences Union 2011 Meeting | May 2011 |
| American Geophysical Union Student Paper Award Judge | 2010 – Present |
| COMPRES Student/post-doc Executive Delegation (Founding Member) | June 2008 – June 2010 |
| COMPRESSED Chairperson | June 2008 – June 2009 |
| COMPRES Program Committee | 2009 |
| COMPRES Discussion Forum Developer/Administrator | 2008 – 2010 |
| High Pressure Working Group, NSLS-II | May 2008 – Present |

PEER REVIEWER HISTORY:

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| Applied Physics Letters | September 2016 – Present |
| Scientific Reports | June 2015 – Present |
| Journal of Applied Crystallography | May 2014 – Present |
| Review of Scientific Instruments | May 2014 – Present |
| Frontiers in Earth Science (Review Editorial Board Member) | April 2014 – Present |
| Icarus | October 2013 – Present |
| Journal of Geophysical Research: Planets | August 2013 – Present |
| Physics and Chemistry of Minerals | March 2013 – Present |
| American Mineralogist | 2012 – Present |
| Geophysical Research Letters | 2011 – Present |
| Journal of Petrology | 2007 – Present |

UNIVERSITY & DEPARTMENTAL SERVICE:

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| Doctoral Dissertation Defense Committee: H.A. Naveen Dharmagunawardhane | December 16, 2016 |
| X17MAC Facility Manager and Webmaster (http://www.mpi.stonybrook.edu/X17MAC/) | July 2011 – 2014 |
| Master's Thesis Defense Committee: Terry-Ann Suer | November 2012 – May 2013 |
| Geodynamics Research Center Foreign Research Liaison | April 2010 – June 2011 |
| Stony Brook Department of Geosciences Graduate Student Representative | April 2008 – July 2009 |
| Mineral Physics Institute Co-Webmaster (http://www.mpi.stonybrook.edu) | March 2008 – July 2009 |
| Ultrasonics Group Webmaster (http://www.mpi.stonybrook.edu/ultrasonics) | 2007 – July 2009 |
| Laboratory Manager – High Pressure Laboratory and Ultrasonics Laboratory | September 2007 – March 2009 |
| Stony Brook Geosciences Department Grad Circus Coordinator | 2003 – 2004, 2008 – 2009 |
| Stony Brook University Teaching Assistant Orientation; GEO Department Representative | August 2008 |
| Stony Brook Geosciences Department Server Administrator | 2003 – 2006 |
| Stony Brook Undergraduate GEO Club Graduate Student Advisor | 2002 – 2004 |

GRANTS AND FUNDING HISTORY:

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| COMPRES Infrastructure Development Grant: Deep-Earth Large-Volume Experimentation (DELVE), FY 2017-2019 (\$42,000) | June 2017 – 2019 |
| JSPS Kaken-Hi Grant-In-Aid #23740394, FY 2011-2012 (¥5,000,000; ¥3,400,000 first year) | May 2010 – 2012 |
| Geodynamics Research Center Faculty Research Allotment, FY 2010 (¥400,000) | April 2011 |
| Global COE Research Grant, FY 2011 (¥350,000) | April 2011 |
| Ehime University Exploratory Research Grant, FY 2010-2011 (¥1,000,000; ¥500,000 per year) | July 2010 – 2012 |
| Geodynamics Research Center Faculty Research Allotment, FY 2010 (¥400,000) | April 2010 |
| Global COE Research Grant, FY 2010 (¥400,000) | April 2010 |
| Global COE Research Grant, FY 2009 (¥500,000) | September 2009 |

WORKSHOPS:

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| COMPRES Software Toolkits for Mineral Physics Workshop | July 2017 |
| Nuclear Resonant Inelastic X-ray Scattering and Synchrotron Mössbauer Spectroscopy Workshop | November 2016 |
| Workshop on High Pressure Multigrain Crystallography | October 2016 |
| Large Multi-Anvil Press Facility Workshop | July 2015 |
| Nuclear Resonant Scattering and Data Analysis Workshop | November 2014 |
| Future Directions in Mineral Physics Workshop | September 2014 |
| EarthCube End-User Domain Workshop for Rock Deformation and Mineral Physics Research | November 2013 |
| USPEX <i>ab initio</i> Structure Prediction Workshop | December 2012 |
| Global COE Tutorial on Ultrasonic Interferometry Measurements Under High Pressure and High Temperature – (Instructor & Co-Leader) Ehime U. | February 2011 |
| Global COE Tutorial on High-T Experiments Under Controlled Oxygen Fugacity – Ehime U. | January 2010 |
| Global COE Short Course on Synchrotron <i>in situ</i> X-ray Diffraction at High Pressure and Temperature – (Team Leader) SPring-8 | December 2009 |
| Global COE Short Course on Analytical Transmission Electron Microscopy – Ehime University | October 2009 |
| 2 nd Vlab Tutorial on Computational Mineral Physics – UC Santa Barbara | July 2008 |
| Future Directions of High-Pressure Research @ NSLS User Meeting (<i>Speaker</i>) | May 2008 |
| International Workshop on Synchrotron High-Pressure Mineral Physics and Materials Science (<i>Presenter</i>) (APS, ANL) | December 2007 |
| EXAFS Data Collection and Analysis Workshop (NSLS, BNL) | July 2003 |

REFERREED PUBLICATIONS:

- Weidner, D.J., Li, L., **Whitaker, M.L.**, and Triplett, R.S. (**submitted**) Ultrasonic Acoustic Velocities During Partial Melting of the Mantle Peridotite, KLB-1. *Journal of Geophysical Research: Solid Earth*.
- Cheung, C.S.N., Weidner, D.J., Li, L., Meredith, P.G., Chen, H., **Whitaker, M.L.**, and Chen, X. (**2017**) Stress Distribution During Cold Compression of a Quartz Aggregate Using Synchrotron X-Ray Diffraction: Observed Yielding, Damage and Grain Crushing. *Journal of Geophysical Research: Solid Earth*, 122(4) 2724-2735. DOI 10.1002/2016JB013653 [PDF](#)
- Whitaker, M.L.**, Baldwin, K.J., and Huebsch, W.R. (**2017**) DIASCoPE: Directly Integrated Acoustic System Combined with Pressure Experiments – A new method for fast acoustic velocity measurements at high pressure. *Review of Scientific Instruments*, 88, 034901. DOI 10.1063/1.4977596 [PDF](#)
- Dobson, D.P., Hunt, S.A., Ahmed, J., Lord, O.T., Wann, E., Santangeli, J., Wood, I.G., Vocablo, L., Walker, A., Mueller, H.J., Lathe, C., **Whitaker, M.L.**, Morard, G., and Mezouar, M. (**2016**) The Phase Diagram of NiSi Under the Conditions of Small Planetary Interiors. *Physics of the Earth and Planetary Interiors*, 261, 196-206. DOI 10.1016/j.pepi.2016.10.005 [PDF](#)
- Hunt, S.A., Weidner, D.J., McCormack, R.J., **Whitaker, M.L.**, Bailey, E., Li, L., Vaughan, M.T., and Dobson, D.P. (**2014**) Deformation T-Cup: A new multi-anvil apparatus for controlled strain-rate deformation experiments at pressures above 18 GPa. *Review of Scientific Instruments*, 85, 085103. DOI 10.1063/1.4891338 [PDF](#)

15. Fujino, K., Nishio-Hamane, D., Nagai, T., Seto, Y., Kuwayama, Y., **Whitaker, M.L.**, Ohfuji, H., Shinmei, T., and Irifune, T. (2014) Spin Transition, Substitution, and Partitioning of Iron in Lower Mantle Minerals. *Physics of the Earth and Planetary Interiors*, 228, 186-191. DOI 10.1016/j.pepi.2013.12.008 [PDF](#)
14. Matsukage, K.N., Nagayo, Y., **Whitaker, M.L.**, Takahashi, E., and Kawasaki, T. (2013) Melting of the Martian mantle from 1.0 to 4.5 GPa. *Journal of Mineralogical and Petrological Sciences*, 108, 201-214. DOI 10.2465/jmps.120820 [PDF](#)
13. Fujino, K., Nishio-Hamane, D., Kuwayama, Y., Sata, N., Murakami, S., **Whitaker, M.L.**, Shinozaki, A., Ohfuji, H., Kojima, Y., Irifune, T., Hiraoka, N., Ishii, H., and Ku-Ding, T. (2013) Spin transition and substitution of Fe³⁺ in Al-bearing post-Mg-perovskite. *Physics of the Earth and Planetary Interiors*, 217, 31-35. DOI 10.1016/j.pepi.2013.01.006 [PDF](#)
12. Zou, Y., Irifune, T., Greaux, S., **Whitaker, M.L.**, Shinmei, T., Ohfuji, H., Negishi, R., and Higo, Y. (2012) Elasticity and sound velocities of polycrystalline Mg₃Al₂(SiO₄)₃ garnet up to 20 GPa and 1700 K. *Journal of Applied Physics*, 112, 014910, 1-9. DOI 10.1063/1.4736407 [PDF](#)
11. Zou, Y., Greaux, S., Irifune, T., **Whitaker, M.L.**, Shinmei, T., and Higo, Y. (2012) Thermal Equation of state of Mg₃Al₂Si₃O₁₂ pyrope garnet up to 19 GPa and 1700 K. *Physics and Chemistry of Minerals*, 39(7) 589-598. DOI 10.1007/s00269-012-0514-z [PDF](#)
10. Liu, W., **Whitaker, M.L.**, Liu, Q., Wang, L., Nishiyama, N., Wang, Y., Kubo, A., Duffy, T.S., and Li, B. (2011) Thermal Equation of State of CaIrO₃ Post-Perovskite. *Physics and Chemistry of Minerals*, 38(5) 407-417. DOI 10.1007/s00269-010-0414-z [PDF](#)
9. **Whitaker, M.L.**, Liu, W., Wang, L., and Li, B. (2010) Acoustic Velocities and Elastic Properties of Pyrite (FeS₂) to 9.6 GPa. *Journal of Earth Science*, 21(5) 792-800. DOI 10.1007/s12583-010-0115-z [PDF](#)
8. Liu, Q., Liu W., **Whitaker M.L.**, Wang L., and Li B. (2010), *In situ* ultrasonic velocity measurements across the fayalite-spinel transformation in Fe₂SiO₄. *American Mineralogist*, 95(7) 1000-1005. DOI 10.2138/am.2010.3369 [PDF](#)
7. Liu, W., Liu, Q., **Whitaker, M.L.**, Zhao, Y., and Li, B. (2009) Experimental and theoretical studies on the elasticity of molybdenum to 12 GPa. *Journal of Applied Physics*, 106(4) 043506. DOI 10.1063/1.3197135 [PDF](#)
6. **Whitaker, M.L.**, Liu, W., Liu, Q., Wang, L., and Li, B. (2009) Thermoelasticity of ε-FeSi to 8 GPa and 1273 K. *American Mineralogist*, 94(7) 1039-1044. DOI 10.2138/am.2009.3166 [PDF](#)
5. Liu, Q., Liu, W., **Whitaker, M.L.**, Wang, L., and Li, B. (2008) Compressional and shear wave velocities of Fe₂SiO₄ spinel at high pressure and high temperature. *High Pressure Research*, 28(3), 405-413. DOI 10.1080/08957950802296287 [PDF](#)
4. **Whitaker, M.L.**, Liu, W., Liu, Q., Wang, L., and Li, B. (2008) Combined *in situ* synchrotron X-ray diffraction and ultrasonic interferometry study of ε-FeSi at high pressure. *High Pressure Research*, 28(3), 385-395. DOI 10.1080/08957950802246480 [PDF](#)
3. **Whitaker, M.L.**, Nekvasil, H., Lindsley, D.H., and McCurry, M. (2008) Can crystallization of olivine tholeiite give rise to potassic rhyolites? An experimental investigation. *Bulletin of Volcanology*, 70(3), 417-434. DOI 10.1007/s00445-007-0146-1 [PDF](#)
2. **Whitaker, M.L.**, Lindsley, D.H., Kubicek-Whitaker, J.M. and Nekvasil, H. (2007) Carbon is not required during crystallization to produce ferrobasalts/ferrodiorites (FTP rocks). *American Mineralogist*, 92(10), 1750-1755. DOI 10.2138/am.2007.2643 [PDF](#)

1. **Whitaker, M.L.**, Nekvasil, H., Lindsley, D.H., and DiFrancesco, N.J. (2007) The role of pressure in producing compositional diversity in intraplate basaltic magmas. *Journal of Petrology*, 48(2), 365-393. DOI 10.1093/petrology/egl063 [PDF](#)

MANUSCRIPTS IN PREPARATION:

Whitaker, M.L. and Li, B. (in revision) New Insights into the Composition of the Earth's Inner Core.

Suer, T.-A., Li, L., **Whitaker, M.L.**, and Weidner, D.J. (in revision) Olivine Viscoelasticity in Sinusoidal Stress Fields at Mantle Conditions. *High Pressure Research*.

Whitaker, S., Reaman, D.M., Kabbes, J.E., Pigott, J.S., **Whitaker, M.L.**, Hovis, G.L., Campbell, A.J., Cottrell, E., Scott, H.P., Panero, W.R. (in preparation) The Possibility of Potassium and Rubidium in Earth's Core.

Whitaker, M.L., Liu, W., Liu, Q., Li, B. (in preparation) Thermal equation of state of ϵ -FeSi and implications for Earth's core.

Whitaker, M.L., Lindsley, D.H., and Filiberto, J. (in preparation) Yamato 980459: Is it really representative of a Martian mantle melt?

Filiberto, J., **Whitaker, M.L.**, Nekvasil, H., Lindsley, D.H. (in preparation) An Experimental Study of the Tholeiitic to Silica-Undersaturated Transition.

Whitaker, M.L., Nekvasil, H., Lindsley, D.H. and Bochiccio, B. (in preparation) The role of water in generating compositional diversity in intraplate basaltic magmas.

CONFERENCE PROCEEDINGS AND EXTENDED ABSTRACTS:

8. Rucks, M.J., Glotch, T.D., **Whitaker, M.L.**, and Parise, J.B. (2017) Preliminary Investigation of Tissintite Formation Using *in situ* Synchrotron X-Ray Diffraction and Multi-Anvil Techniques. Lunar and Planetary Science Conference, XLVIII, Abstract #2427. [Link to PDF](#)
7. Fujino, K., Nishio-Hamane, D., Nagai, T., Seto, Y., Kuwayama, Y., Sata, N., **Whitaker, M.L.**, Ohfuji, H., Shinmei, T., Irifune, T. (2013) Spin transition of iron in Al-bearing Mg-perovskite and post-Mg-perovskite. Global Center of Excellence / TANDEM 2013 International Symposium. (Abstract and Talk)
6. Fujino, K., Hamane, D., Seto, Y., Sata, N., Nagai, T., Shinmei, T., Kuwayama, Y., Murakami, S., **Whitaker, M.L.**, Irifune, T., Ishii, H., Hiraoka, N., Tsuei, K-D. (2010) Spin Transition of Ferric Iron in Mg-Perovskite and Post-Mg-Perovskite. Japan Society of High Pressure Science and Technology 2010 Annual Meeting.
5. Fujino, K., Hamane, D., Kuwayama, Y., Sata, N., Murakami, S., **Whitaker, M.L.**, Shinozaki, A., Ohfuji, H., Kojima, Y., Irifune, T., Ishii, H., Hiraoka, N., Tsuei, K-D. (2010) Spin Transition of Ferric Iron in Post-Mg-Perovskite by X-ray Emission Spectroscopy. Japan Association of Mineralogical Sciences 2010 Annual Meeting.
4. **Whitaker, M.L.**, Liu, W., Liu, Q., Wang, L., Li, B. (2007) Combined *in situ* synchrotron X-ray diffraction and ultrasonic interferometry study of ϵ -FeSi at high pressure and temperature. International Workshop on Synchrotron High-Pressure Mineral Physics and Materials Science. (Abstract & Poster) [PDF](#)
3. McCubbin, F.M., **Whitaker, M.L.**, Lindsley, D.H., and Nekvasil, H. (2005) Kaersutite (Ti-rich amphibole) in the SNC Meteorites: Can it crystallize at low pressure? Lunar and Planetary Science Conference, XXXVI, Abstract #1967. (Abstract & Poster) [Link to PDF](#)
2. **Whitaker, M.L.**, Nekvasil, H., and Lindsley, D.H. (2005) Potential magmatic diversity on Mars. Lunar and Planetary Science Conference, XXXVI, Abstract #1440. (Abstract & Talk) [Link to PDF](#)

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ABSTRACTS:

65. Rucks, M.J., Glotch, T.D., **Whitaker, M.L.**, and Parise, J.B. (2017) Investigation of Tissintite Formation Using *in situ* Synchrotron X-Ray Diffraction and Multi-Anvil Techniques. 80th Annual Meeting of the Meteoritical Society, LPI Contrib. No. 1987, Abstract #6325.
64. Hunt, S.A., Dobson, D.P., Bailey, E., Ezad, I.S., Pamato, M.G., Schardong, L., Thomson, A.R., Lord, O.T., Walker, A.M., **Whitaker, M.L.** (2017) The effect of sintering pressure on the anelastic properties of pyrope. COMPRES 2017 Annual Meeting.
63. Li, L., Weidner, D.J., **Whitaker, M.L.**, and Triplett, R.S. (2017) Ultrasonic Acoustic Wave Velocities of Neighborite (NaMgF₃) Across Orthorhombic and Cubic Phase Boundary at High P-T. COMPRES 2017 Annual Meeting.
62. Weidner, D.J., Li, L., **Whitaker, M.L.**, and Triplett, R.S. (2017) P Wave and S Wave Acoustic Velocities of Partial Molten Peridotite at Mantle P-T and MHz Frequencies. COMPRES 2017 Annual Meeting.
61. **Whitaker, M.L.**, Baldwin, K.J., and Huebsch, W.R. (2017) DIASCoPE: A New Method for Fast Acoustic Velocity Measurements at High Pressure – Changing the Paradigm from Product to Process. COMPRES 2017 Annual Meeting.
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59. Triplett, R.S., Weidner, D.J., **Whitaker, M.L.**, and Chen, H. (2017) Anvil Development for the DT25 Press and Mineral Physics Applications. COMPRES 2017 Annual Meeting.
58. **Whitaker, M.L.**, Rucks, M.J., Sims, M.L., and Jaret, S.J. (2017) Necessity is the Mother of Invention – New Non-Traditional Experimental Techniques That Suggest Insanity is its Father. COMPRES 2017 Annual Meeting.
57. Chen, H., **Whitaker, M.L.**, Baldwin, K.J., Huebsch, W.R., Vaughan, M.T., and Weidner, D.J. (2017) COMPRES Multi-Anvil Facility at Beamline 6-BM-B of the Advanced Photon Source. COMPRES 2017 Annual Meeting. (Talk)
56. **Whitaker, M.L.**, Baldwin, K.J., Huebsch, W.R., Vaughan, M.T., and Weidner, D.J. (2017) COMPRES Multi-Anvil Facility at Beamline XPD-D at NSLS-II. COMPRES 2017 Annual Meeting. (Talk)
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54. **Whitaker, M.L.**, Baldwin, K.J., and Huebsch, W.R., (2016) A New Method for Fast Acoustic Velocity Measurements at High Pressure – Changing the Paradigm from Product to Process. Abstract M12A-04 at 2016 Fall Meeting, AGU, San Francisco, CA., 12-16 Dec. (Talk)
53. Li, L., **Whitaker, M.L.**, Triplett, R., and Weidner, D.J., (2016) Acoustic Velocities Across the Perovskite Phase Transition in NaMgF₃. Abstract MR23A-2666 at 2016 Fall Meeting, AGU, San Francisco, CA., 12-16 Dec.

52. Weidner, D.J., Li, L., **Whitaker, M.L.**, and Triplett, R. (2016) P Wave and S Wave Acoustic Velocities of Partial Molten Peridotite at Mantle P-T and MHz Frequencies. Abstract MR21A-2627 at 2016 Fall Meeting, AGU, San Francisco, CA., 12-16 Dec.
51. Hunt, S.A., Dobson, D.P., Bailey, E., Ezad, I., Schardong, L., Pamato, M.G., Thomson, A., Walker, A., **Whitaker, M.L.**, and Weidner, D.J. (2016) The Effect of Sintering Pressure on the Anelastic Properties of Pyrope. Abstract MR23A-2661 at 2016 Fall Meeting, AGU, San Francisco, CA., 12-16 Dec.
50. Terce, N., Bejina, F., Bystricky, M., **Whitaker, M.L.**, Chen, H. (2016) Bulk Modulus of Fe-rich Olivines. 54th European High Pressure Research Group Meeting, Bayreuth, Germany, 4-9 September, 2016.
49. **Whitaker, M.L.**, Chen, H., Baldwin, K.J., Huebsch, W.R., Vaughan, M.T., Weidner, D.J., (2016) Six-BoMB: COMPRES Multi-Anvil Facility at Beamline 6-BM-B of the Advanced Photon Source. COMPRES 2016 Annual Meeting. (Talk)
48. **Whitaker, M.L.**, Baldwin, K.J., Huebsch, W.R., Vaughan, M.T., Weidner, D.J., (2016) XP-Deuce: Planned COMPRES Multi-Anvil Facility at Beamline XPD-D at NSLS-II. COMPRES 2016 Annual Meeting. (Talk)
47. **Whitaker, M.L.**, Chen, H., Baldwin, K.J., Huebsch, W.R., Vaughan, M.T., Weidner, D.J., (2015) New COMPRES Multi-Anvil Facility at Beamline 6-BM-B of the Advanced Photon Source: Open for Business! COMPRES 2015 Annual Meeting. (Talk)
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43. **Whitaker, M.L.**, Baldwin, K.J., Huebsch, W.B., Terce, N., Bejina, F., Bystricky, M., Chen, H., Vaughan, M.T., Weidner, D.J. (2014) Introducing DIASCoPE: Directly Integrated Acoustic System Combined with Pressure Experiments — Changing the Paradigm from Product to Process. Abstract MR13A-07 at 2014 Fall Meeting, AGU, San Francisco, CA., 15-19 Dec. (Talk)
42. Cheung, C.S.N., Weidner, D.J., Li, L., Chen, H., **Whitaker, M.L.**, Chen, X. (2014) Compaction of quartzite at low pressure using synchrotron X-ray diffraction multi-anvil apparatus. Abstract MR11A-4302 at 2014 Fall Meeting, AGU, San Francisco, CA., 15-19 Dec.
41. Proietti, A., Bystricky, M., Bejina, F., **Whitaker, M.L.**, Chen, H. (2014) Rheology of Olivine and Orthopyroxene at Upper Mantle Conditions. 2014 Réunion des Sciences de la Terre, Pau, France. (in French)
40. Terce, N., Bejina, F., Bystricky, M., **Whitaker, M.L.**, Chen, H. (2014) Elastic Parameters of Fe-rich Olivines. 2014 Réunion des Sciences de la Terre, Pau, France. (in English)
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34. **Whitaker, M.L.**, Chen, H., Vaughan, M.T., Weidner, D.J., Baldwin, K.J., Huebsch, W.B. (2013) Present State-of-the-Art and Future Developments in COMPRES Synchrotron-Based Multi-Anvil Research. Abstract MR31A-2295 at 2013 Fall Meeting, AGU, San Francisco, CA., 9-13 Dec.
33. Li, L., Weidner, D.J., Du, W., Chen, H., **Whitaker, M.L.** (2013) Deformation of Peridotite at Upper Mantle Conditions. Abstract MR41A-2353 at 2013 Fall Meeting, AGU, San Francisco, CA., 9-13 Dec.
32. Weidner, D.J., Li, L., Du, W., **Whitaker, M.L.**, Chen, H. (2013) Kinetics of Partial Melting in a Mantle Peridotite. Abstract MR41A-2359 at 2013 Fall Meeting, AGU, San Francisco, CA., 9-13 Dec.
31. Hunt, S.A., **Whitaker, M.L.**, Santangeli, J., Li, L., Vaughan, M.T., Weidner, D.J., Dobson, D.P. (2013) Deformation T-Cup: A new Kawai-style deformation device capable of controlled strain-rate deformation at pressures in excess of 20 GPa. 2013 Gordon Research Conference on Deep Earth Interior. (Talk)
30. **Whitaker, M.L.**, Chen, H., Vaughan, M.T., Weidner, D.J., (2012) Synchrotron Studies Under Extreme Conditions: Tackling the Multi-Phase with the Multi-Anvil. Abstract MR43C-2327 presented at 2012 Fall Meeting, AGU, San Francisco, CA., 3-7 Dec.
29. Zou, Y., Irifune, T., Greaux, S., **Whitaker, M.L.**, Ohfuji, H., Shinmei, T., Higo, Y., Li, B. (2012) Ultrasonic Elastic Wave Velocity Measurements of Polycrystalline Pyrope Garnet up to 20 GPa and 1700 K, Abstract MR43C-2333 presented at 2012 Fall Meeting, AGU, San Francisco, CA., 3-7 Dec.
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26. Zou, Y., Irifune, T., Greaux, S., **Whitaker, M.L.**, Shinmei, T., Ohfuji, H., Higo, Y. (2012) Ultrasonic Measurements of the Sound Velocities in Polycrystalline Pyrope Garnet at High Pressure and High Temperature, AOGS-AGU WPGM Joint Assembly 2012, Abstract SE66-A010 (Talk)
25. **Whitaker, M.L.**, Chen, H., Vaughan, M.T., Weidner, D.J., Baldwin, K.J., Huebsch, W., Koleda, C.C. (2012) Multi-Anvil High Pressure Facilities at the National Synchrotron Light Source: X17MAC. High Pressure Mineral Physics Seminar 8 (HPMPS8) / COMPRES 2012 Annual Meeting
24. Weidner, D.J., **Whitaker, M.L.**, Chen, H., Vaughan, M.T. (2012) NSLS Multi-Anvil Facility Update. High Pressure Mineral Physics Seminar 8 (HPMPS8) / COMPRES 2012 Annual Meeting
23. Fujino, K., Nishio-Hamane, D., Nagai, T., Seto, Y., Kuwayama, Y., **Whitaker, M.L.**, Ohfuji, H., Shinmei, T., Irifune, T. (2012) New Development of Spin Transition Problems of Iron in Lower Mantle Minerals. High Pressure Mineral Physics Seminar 8 (HPMPS8) / COMPRES 2012 Annual Meeting (Talk)

22. **Whitaker, M.L.****, Li, B., Irifune, T. (2011) Insights into the Light Element(s) in Earth's Inner Core from *in situ* Acoustic Velocity Measurements (**Invited). Abstract MR52A-02 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec. (Invited Talk)
21. Fujino, K., Hamane, D., Seto, Y., Nagai, T., Shinmei, T., **Whitaker, M.L.**, Kuwayama, Y., Ohfuji, H., Irifune, T., Hiraoka, N., Ishii, H. (2011) Spin States of Ferric Iron in Al-bearing Mg-perovskite and Post-Mg-perovskite in the Lower Mantle. Abstract MR34A-06 presented at 2011 Fall Meeting, AGU, San Francisco, Calif., 5-9 Dec. (Talk)
20. **Whitaker, M.L.** (2011) Experimental Insights into the Light Element(s) in Earth's Inner Core from *in situ* Elastic Wave Velocity Measurements, Japan Geoscience Union Meeting 2011, Abstract SIT003-13 (Talk)
19. **Whitaker, M.L.**, Tsuchiya, T., and Li, B. (2010) New Experimental and Theoretical Insights into the Composition of the Earth's Inner Core, Eos Trans. AGU, 91(26), West. Pac. Geophys. Meet. Suppl., Abstract V21A-097
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17. **Whitaker, M.L.**, Liu, W., Weidner, D.J., Li, B. (2009) Iron/Light-Element Alloys at Extreme Conditions and Their Implications for the Earth's Core, Eos Trans. AGU, 90(52), Fall Meet. Suppl., Abstract DI33A-1616
16. **Whitaker, M.L.**, Liu, W., Wang, L., and Li, B. (2009) A Journey Toward the Center of the Earth: Iron/Light-Element Alloys at Extreme Conditions and Their Implications for the Earth's Core. COMPRES 2009 Annual Meeting. (Invited Talk)
15. **Whitaker, M.L.**, Liu, W., Liu, Q., Wang, L., Li, B. (2008) Acoustic velocities and thermoelastic properties of FeSi at high P and T, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract DI43A-1765 [*AGU SEDI Section Best Student Paper Award*](#)
14. Li, B., Liu, W., Liu, Q., **Whitaker, M.L.** (2008) Elasticity and Density Measurements on Melts and Amorphous Materials at High Pressure, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract MR33C-05 (Invited Talk)
13. Liu, Q., Liu, W., **Whitaker, M.L.**, Wang, L., Li, B. (2008) In-situ elasticity measurements on fayalite to 8.7 GPa and 1073 K, Eos Trans. AGU, 89(53), Fall Meet. Suppl., Abstract MR53A-1713
12. **Whitaker, M.L.**, Liu, Q., Liu, W., Wang, L., and Li, B. (2008) Compressional and Shear Wave Velocities in ϵ -FeSi to 12 GPa. The 2008 Gordon Research Conference on Research at High Pressure.
11. Liu, Q., Liu, W., **Whitaker, M.L.**, Wang, L., and Li, B. (2008) *In situ* Ultrasonic observations of elasticity changes across the phase transformation in Fe_2SiO_4 at 1173 K. COMPRES 2008 Annual Meeting.
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9. **Whitaker, M.L.**, Liu, Q., Liu, W., Wang, L., and Li, B. (2008) High Pressure Synchrotron and Ultrasonic Interferometry Study of ϵ -FeSi. Future Directions In High Pressure Research Workshop, NSLS/CFN 2008 User Meeting. (Talk)
8. Liu, Q., Isaak, D., Liu, W., **Whitaker, M.L.**, Wang, L., Zhao, Y., Li, B. (2008) Thermoelasticity of tantalum: An integrated acoustic and diffraction study at high pressure and high temperature. Stewardship Science Academic Alliances 2008 Program Symposium (Poster Only)
7. Li, B., Liu, W., Liu, Q., **Whitaker, M.L.**, Zhang, J., Zhao, Y., Isaak, D. (2008) Thermoelasticity of SSP Materials: An Integrated Acoustic and Diffraction Study at High P and High T. Stewardship Science Academic Alliances 2008 Program Symposium (Abstract & Talk)

6. Liu, W., **Whitaker, M.L.**,* Wang, L., Li, B. (2007), Sound velocities of iron sulfide at high pressure and high temperature, Eos Trans. AGU, 88(52), Fall Meet. Suppl., Abstract MR31B-0374 (*Added late to Abstract, presented Poster at meeting)
5. Whitaker, J.M., **Whitaker, M.L.**, Lindsley, D.H., and Nekvasil, H. (2005) Testing the dependence of liquid evolution paths on the presence of carbon during fractional crystallization. Stony Brook University URECA Program Conference. (Abstract & Poster)
4. **Whitaker, M.L.**, Nekvasil, H., and Lindsley, D.H. (2004) Can fractionation of an olivine tholeiite give rise to potassic rhyolites? GSA Abstracts w/ Program, 36(4), 25. (Abstract & Talk)
3. DiFrancesco, N.J., **Whitaker, M.L.**, Nekvasil, H., and Lindsley, D.H. (2003) A road to rhyolite: Fractional crystallization experiments on a continental olivine tholeiite. GSA Abstracts w/ Program, 35(6), 631. (Abstract & Poster)
2. Nekvasil, H., Lindsley, D.H., **Whitaker, M.L.**, Filiberto, J., DiFrancesco, N.J., Rossier, L., and Horn, J. (2003) Tholeiites, anorthosites, potassic granites, sodic trachytes, and tephriphonolites: Is there a link? GSA Abstracts w/ Program, 35(6), 395. (Abstract & Talk)
1. **Whitaker, M.L.**, DiFrancesco, N.J., Lindsley, D.H., and Nekvasil, H. (2003) Can fractionation of an olivine tholeiite give rise to ferrodiorites, ferrobasalts, and anorthosites? GSA Abstracts w/ Program, 35(6), 631. (Abstract & Poster)