

Mainak Mookherjee

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Department of Earth, Ocean &
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Professional Appointments

2019-	Associate Professor of Geology, Florida State University
2015-2019	Assistant Professor of Geology, Florida State University
2012-2015	Research Scientist, Cornell University
2008-2012	Visiting Researcher, Bayerisches Geoinstitut, Germany
2006-2008	Post-doctoral Researcher, Yale University
2003-2005	Post-doctoral Researcher, University of Michigan

Education

2004	Ph.D. (Earth Sciences)	University of Cambridge, Cambridge, U.K.
1999	M.Sc. (Applied Geology)	Indian Institute of Technology, Mumbai, India
1997	B.Sc. (Geology)	Jadavpur University, Kolkata, India

Funding/Grants

5. "Faculty Early CAREER development Award: Volatiles in the deep Earth: insights from theory and experiments" from "Petrology & Geochemistry" and "Geophysics", National Science Foundation, Single PI, 2018-2023
https://www.nsf.gov/awardsearch/showAward?AWD_ID=1753125&HistoricalAwards=false
4. "CSEDI Collaborative Research: C-O-H Volatile Metasomatism in the Cratonic Mantle - Implications for Mid-Lithospheric Discontinuities" from "Studies of Earth's Deep Interior", National Science Foundation, 2018-2021.
https://www.nsf.gov/awardsearch/showAward?AWD_ID=1763215&HistoricalAwards=false
3. "Early Career: Acquisition of a Raman Spectrometer for a Mineral Physics research laboratory" from "Instrumentation & Facilities", National Science Foundation, Single PI, 2017-2018. https://www.nsf.gov/awardsearch/showAward?AWD_ID=1638752
2. "Aluminous phase at high-pressures & temperatures: Elasticity & energetics of hydrogen incorporation" from "Geophysics" & "Petrology and Geochemistry", National Science Foundation, Single PI, 2016-2018
http://www.nsf.gov/awardsearch/showAward?AWD_ID=1634422
1. "High-pressure and temperature elasticity and equation of state of hydrous phase" from "Petrology and Geochemistry" & "Geophysics", National Science Foundation, Single PI, 2013-2015 & 2016-2018. http://www.nsf.gov/awardsearch/showAward?AWD_ID=1250477
http://www.nsf.gov/awardsearch/showAward?AWD_ID=1639552

Publications

Web of Science: <https://www.webofscience.com/wos/author/record/231188>

Google Scholar: <http://scholar.google.com/citations?user=WNllcCAAAAAJ&hl=en>

Note: ~high-school students; *undergraduate students; #graduate students; \$post-doctoral scholars mentored by PI.

Book Chapter/ Encyclopedia articles:

02. Li, J., Chen, B., **Mookherjee, M.**, and Morard, G., 2019, Carbon versus other light elements in the Earth's core. In Beth N. Orcutt, Isabelle Daniele, & Rajdeep Dasgupta (Eds.), *Deep Carbon: Past to Present* (pp. 40-65). Cambridge University Press.
01. **Mookherjee, M.**, 2016, Aluminum, In White, WM. (Ed.), *Encyclopedia of Geochemistry*. Encyclopedia of Earth Sciences Series. Springer.
https://link.springer.com/referenceworkentry/10.1007/978-3-319-39193-9_214-1

Journal articles:

66. Basu, A\$, **Mookherjee, M.**, Bucag, C*, Tkachev, S., and Wunder, B., 202X, High-pressure behavior of 3.65 Å phase: Insights from Raman Spectroscopy, *American Mineralogist*, *in press*, doi: 10.2138/am-2022-8515.
65. Bajgain, S\$, Ashley, A. W#, **Mookherjee, M.**, Ghosh, D. B., and Karki, B. B., 2022, Insights into magma ocean dynamics from the transport properties of basaltic melt, *Nature Communications*, 13, 7590, <https://doi.org/10.1038/s41467-022-35171-y>.
64. Peng, Y#, **Mookherjee, M.**, Hermann, A., Manthilake, G., and Mainprice, D., 2022, Anomalous elasticity of talc at high pressures: Implications for subduction systems, *Geoscience Frontiers*, 13, 101381, <http://doi.org/10.1016/j.gsf.2022.101381>.
63. Basu, A\$, **Mookherjee, M.**, McMahan, E*, Haberl, B., and Boehler, R., 2022, Behavior of Long-Chain Hydrocarbons at High Pressures and Temperatures, *The Journal of Physical Chemistry B*, 126, 2350-2357, <http://doi.org/10.1021/acs.jpcc.1c10786>.
62. Peng, Y#, Manthilake, G., and **Mookherjee, M.**, 2022, Electrical conductivity of metasomatized lithology in subcontinental lithosphere, *American Mineralogist*, <http://doi.org/10.2138/am-2021-7942>.
61. Manthilake, G., Peng, Y#, Koga, K. T., and **Mookherjee, M.**, 2021, Tracking slab surface temperatures with electrical conductivity of glaucophane, *Scientific Reports*, <https://doi.org/10.1038/s41598-021-97317-0>
60. Bajgain, S\$, and **Mookherjee, M.**, 2021, Carbon bearing aluminosilicate melt at high-pressure, *Geochimica Cosmochimica Acta*, 312, 106-123.
59. Bajgain, S\$, **Mookherjee, M.**, and Dasgupta, R., 2021, Earth's core could be the largest terrestrial carbon reservoir, *Communications Earth and Environment*, 2, 165, <https://doi.org/10.1038/s43247-021-00222-7>.
58. Basu, A\$, and **Mookherjee, M.**, 2021, Intercalation of Water in Kaolinite ($\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$) at Subduction Zone Conditions: Insights from Raman Spectroscopy, *ACS Earth and Space Chemistry*, 5, 834-848, <https://dx.doi.org/10.1021/acsearthspacechem.0c00349>.

57. Lee, J., **Mookherjee, M.**, Kim, T.M., Jung, H., and Klemd, R., 2021, Seismic anisotropy in subduction zones: evaluating role of chloritoid, *Frontiers in Earth Sciences- Solid Earth Geophysics*, <http://doi.org/10.3389/feart.2021.644958>.
56. Manthilake, G., Koga, K. T., Peng, Y#, and **Mookherjee, M.**, 2021, Halogen bearing amphiboles, aqueous fluids, and melts in subduction zones: Insights on halogen cycle from electrical conductivity, *Journal of Geophysical Research Solid Earth*, <http://doi.org/10.1029/2020JB21339>.
55. Saha, S., Peng, Y#, Dasgupta, R., **Mookherjee, M.**, and Fischer, K., 2021, Assessing the presence of volatile-bearing mineral phases in the cratonic mantle as a possible cause of mid-lithospheric discontinuities, *Earth and Planetary Science Letters*, 553, 116602.
54. Manthilake, G., **Mookherjee, M.**, and Miyajima, N., 2021, Insights on the deep carbon cycle from the electrical conductivity of carbon-bearing aqueous fluids, *Scientific Reports*, 11, 3745.
53. Basu, A\$, **Mookherjee, M.**, Schiffert, C*, Haberl, B., and Boehler, R., 2021, Spectroscopic investigation of the high-pressure behavior of aliphatic hydrocarbon: implications for planetary processes, *ACS Earth and Space Chemistry*, 5, 449- 456, <http://doi.org/10.1021/acsearthspacechem.0c00259>.
52. Peng, Y\$, and **Mookherjee, M.**, 2020, Thermoelasticity of tremolite amphibole: Geophysical implications, *American Mineralogist*, 105, 904-916.
51. Basu, A\$, Murphy, P*, **Mookherjee, M.**, Haberl, B., and Boehler, R., 2020, High-pressure behavior of linear chain alkane, tricosane, *Journal of Applied Physics*, 127, 105901.
50. Bajgain, S\$, and **Mookherjee, M.**, 2020, Structure and Properties of Albite Melt at High Pressures, *ACS Earth and Space Chemistry*, 4, 1-13.
49. Xu, M., Jing, Z., Bajgain, S\$, **Mookherjee, M.**, Van Orman, J., Yu, T., & Wang, Y., 2020, High-pressure elastic properties of dolomite melt supporting carbonate-induced melting in deep upper mantle, *Proceedings of the National Academy of Sciences of the United States of America PNAS*, 117, 18285-18291.
48. Manthilake, G., Schiavi, F., Zhao, C., **Mookherjee, M.**, Bouhifd, M., & Jouffret, L., 2020, The electrical conductivity of libermannite: Implications for water transport into the Earth's lower mantle, *Journal of Geophysical Research Solid-Earth*, 125, e2020JB020094.
47. Bajgain, S\$, Peng, Y#, **Mookherjee, M.**, Jing, Z., and Solomon, M~, 2019, Properties of hydrous aluminosilicate melt at high pressures, *ACS Earth and Space Chemistry*, 3, 390-402.
46. Bajgain, S\$, **Mookherjee, M.**, Dasgupta, R., Ghosh, D., and Karki, B., 2019, Nitrogen in the Earth's Outer Core, *Geophysical Research Letters*, 46, 89-98.
45. **Mookherjee, M.**, Panero, W. R., Jahn, S., and Wunder, B., 2019, Anomalous elastic behavior of phase Egg, $\text{AlSiO}_3(\text{OH})$, at high pressure, *American Mineralogist* 104, 130-139.
44. Tennakoon, S\$, Peng, Y#, **Mookherjee, M.**, Speziale, S., Manthilake, G., Besara, T., Andreu, L~, and Rivera, F~, 2018, Single crystal elasticity of natural topaz at high-temperatures, *Scientific Reports*, 8, 1372.

43. Tennakoon, SŞ., Gladden, J., **Mookherjee, M.**, Besara, T., and Siegrist, T., 2017, Temperature-dependent elasticity of $\text{Pb}[(\text{Mg}_{0.33}\text{Nb}_{0.67})_{1-x}\text{Ti}_x]\text{O}_3$, *Physical Review B*, 96, 134108.
42. Peng, Y#, **Mookherjee, M.**, Hermann, A., Bajgain, S. KŞ., Liu, S*, and Wunder, B., 2017, Elasticity of phase-Pi ($\text{Al}_3\text{Si}_2\text{O}_7(\text{OH})_3$)- A hydrous aluminosilicate phase, *Physics of Earth and Planetary Interiors*, 269, 91-97.
41. Ghosh, D. B., Bajgain, S. KŞ., **Mookherjee, M.**, and Karki, B. B., 2017, Carbon-bearing silicate melt at deep mantle conditions, *Scientific Reports*, 7, 848.
40. Hermann, A., and **Mookherjee, M.**, 2016, High-pressure phase of brucite stable at Earth's mantle transition zone and lower mantle conditions, *Proceedings of the National Academy of Sciences of the United States of America PNAS*, doi:10.1073/pnas.1611571113.
39. **Mookherjee, M.**, Mainprice, D., Maheshwari, K., Heinonnen, O., Patel, D~, and Hariharan, A*, 2016, Pressure induced elastic softening in framework aluminosilicate- albite ($\text{NaAlSi}_3\text{O}_8$), *Scientific Reports*, 6, 3481.
38. Manthilake, G., Bolfan-Casanova, N., Novella, D., **Mookherjee, M.**, and Andrault, D., 2016, Dehydration of chlorite explains anomalously high electrical conductivity in the mantle wedges, *Science Advance*, 2, e1501631.
37. Demichelis, R., De La Pierre, M., **Mookherjee, M.**, Zicovich-Wilson, C. M., and Orlando, R., 2016, Serpentine polymorphism: a quantitative insight from first-principles calculations, *CrystEnggComm*, doi:10.1039/C6CE00190D
36. **Mookherjee, M.**, Tsuchiya, J., and Hariharan, A*, 2016, Elasticity of hydrous aluminosilicate mineral- topaz ($\text{Al}_2\text{SiO}_4(\text{OH})_2$) at high pressures, *Physics of Earth and Planetary Interiors*, 251, 24-35.
35. Tsuchiya, J., and **Mookherjee, M.**, 2015, Crystal structure, equation of state, and elasticity of phase H (MgSiO_4H_2) at the Earth's lower mantle pressure, *Scientific Reports*, 5, 15534, doi: 10.1038/srep15534.
34. Manthilake, G., **Mookherjee, M.**, Bolfan-Casanova, N., and Andrault, D., 2015, Electrical conductivity of lawsonite and dehydrating fluids at high-pressures and temperatures, *Geophysical Research Letters*, 42, doi:10.1002/2015GL064804.
33. **Mookherjee, M.**, Speziale, S., Marquardt, H., Jahn, S, Wunder, B., Koch-Müller, M Liermann, H.-P., 2015, Equation of state and elasticity of the 3.65 Å phase, *American Mineralogist*, 100, 2199-2208, doi:http://dx.doi.org/10.2138/am-2015-5312.
32. **Mookherjee, M.**, and Tsuchiya, J., 2015, Elasticity of superhydrous phase, B, $\text{Mg}_{10}\text{Si}_3\text{O}_{14}(\text{OH})_4$, *Physics of Earth and Planetary Interiors*, 238, 42-50.
31. Prescher, C., Dubrovinsky, L., Bykova, E., Kuppenko, I., Glazyrin, K., Kantor, A., McCammon, C., **Mookherjee, M.**, Nakajima, Y., Miyajima, N., Sinmiyo, R., Cerantola, V., Dubrovinskaia, N., Prakapenka, V., Rüffer, R., Chumakov, A., and Hanfland, M., 2015, High Poisson's ratio of Earth's inner core explained by carbon alloying, *Nature Geoscience*, 8, 220-223, doi:10.1038/ngeo2370.
30. **Mookherjee, M.**, 2014, High-pressure elasticity of sodium majorite garnet, $\text{Na}_2\text{MgSi}_5\text{O}_{12}$, *American Mineralogist*, 99, 2416-2423.

29. Chedda, T*, **Mookherjee, M.**, Mainprice, D., Moreira dos Santos, A. F., Molaison, J., Manthilake, M. A. G., Chantel, J., and Bassett, W. A., 2014, Structure and elasticity of phlogopite under compression: Geophysical implications, *Physics of Earth and Planetary Interiors*, 233, 1-12, doi: 10.1016/j.pepi.2014.05.004.
28. **Mookherjee, M.**, Keppler, H., and Manning, C., 2014, Aluminum speciation in aqueous fluids at deep crustal pressure and temperature, *Geochimica Cosmochimica Acta*, 133, 128-141, doi: 10.1016/j.gca.2014.02.016.
27. **Mookherjee, M.**, and Mainprice, D., 2014, Unusually large shear wave anisotropy for chlorite in subduction zone settings, *Geophysical Research Letters*, 41, 1506-1513, doi: 10.1002/2014GL059334.
26. **Mookherjee, M.**, Karki, B. B., Stixrude, L., and Lithgow-Bertelloni, C., 2012, Energetics, equation of state, and elasticity of NAL phase: potential host for alkali and aluminum in the lower mantle, *Geophysical Research Letters*, 39, L19306, doi:10.1029/2012GL053682.
25. Chantel, J#, **Mookherjee, M.**, and Frost, D. J., 2012, Low velocity layer: elasticity of lawsonite at high pressures, *Earth and Planetary Science Letters*, 249-250, 116-125. PhD student of Prof. Frost worked closely with me on this project.
24. **Mookherjee, M.**, and Bezacier, L., 2012, The low velocity layer in subduction zone: structure and elasticity of glaucophane at high pressures, *Physics of Earth and Planetary Interiors*, 208-209, 50-58.
23. Wu, X., **Mookherjee, M.**, Gu, T., and Qin, S., 2011, Elasticity and anisotropy of iron-nickel phosphides at high pressures, *Geophysical Research Letters*, 38, 20301.
22. **Mookherjee, M.**, 2011, Elasticity and anisotropy of Fe₃C: implications for the Earth's inner core, *American Mineralogist*, 96, 1530-1536.
21. **Mookherjee, M.**, 2011, Mid-mantle anisotropy: Elasticity of aluminous phases in subducted MORB. *Geophysical Research Letters*, 38, L14302.
20. **Mookherjee, M.**, and Capitani, G. C., 2011, Trench parallel anisotropy and large delay times: Elasticity and anisotropy of antigorite at high pressure. *Geophysical Research Letters*, 38, L09315.
19. **Mookherjee, M.**, Nakajima, Y., Steinle-Neuman, G., Glazyrin, K., Wu, X., Dubrovinsky, L., McCammon, C., and Chumakov, A., 2011, High pressure behavior of iron carbide (Fe₇C₃) at inner core conditions, *Journal of Geophysical Research Solid-Earth*, 116, B04201.
18. **Mookherjee, M.**, and Karato, S., 2010, Solubility of water in pyrope-rich garnet at high pressure and temperature, *Geophysical Research Letters*, 37, L03310.
17. Karki, B. B., Bhattarai, D., **Mookherjee, M.**, and Stixrude, L., 2010, Visualization and analysis of structural and dynamical properties of simulated hydrous silicate melt, *Physics and Chemistry of Minerals*, 37, 103-117.
16. **Mookherjee, M.**, and Steinle-Neumann, G., 2009, Detecting deeply subducted crust from elasticity of hollandite, *Earth and Planetary Science Letters*, 288, 349-358.
15. Kawazoe, T., Karato, S-i., Otsuka, K., Jing, Z. and **Mookherjee, M.**, 2009, Shear deformation of dry polycrystalline olivine under deep upper mantle conditions

- using rotational Drickamer apparatus (RDA), *Physics of Earth and Planetary Interiors*, 174, 128-137.
14. **Mookherjee, M.**, and Steinle-Neumann, G., 2009, Elasticity of phase-X at high pressure, *Geophysical Research Letters*, 36, L08307, doi:10.1029/2009GL037782.
 13. **Mookherjee, M.**, and Stixrude, L., 2009, Structure and elasticity of serpentine at high-pressure, *Earth and Planetary Science Letters*, 279, 11-19.
 12. Stixrude, L., de Koker, N., Sun, N., **Mookherjee, M.**, and Karki, B., 2009, Thermodynamics of silicate liquid in the deep Earth, *Earth and Planetary Science Letters*, 278, 226-232.
 11. **Mookherjee, M.**, Stixrude, L., and Karki, B., 2008, Hydrous silicate melts at high pressure, *Nature*, 452, 983-986.
 10. Wang, D., **Mookherjee, M.**, Xu, Y. and Karato, S., 2006, The effect of water on the electrical conductivity of olivine, *Nature*, 443, 977-980.
 09. **Mookherjee, M.**, and Stixrude, L., 2006, High-pressure proton disorder in brucite, *American Mineralogist*, 91, 127-134.
 08. **Mookherjee, M.**, Welch, M. D., Le Polle's, L., Redfern, S. A. T., and Harlov, D. E., 2005, Ammonium ion behavior in feldspar: variable-temperature infrared and ²H NMR studies of synthetic buddingtonite, N(D,H)₄AlSi₃O₈, *Physics and Chemistry of Minerals*, 32,126-131.
 07. **Mookherjee, M.**, Redfern, S. A. T., Swainson, I., and Harlov, D. E., 2004, Low-temperature behavior of ammonium ion in buddingtonite [N(D,H)₄AlSi₃O₈] from neutron powder diffraction, *Physics and Chemistry of Minerals*, 31, 643-649.
 06. **Mookherjee, M.**, Redfern, S. A. T., and Zhang, M., 2004, Far-infrared spectra of ammonium layer and framework silicates, *Neues Jahrbuch für Mineralogie Monatshefte*, Jg.2004, 1-9.
 05. **Mookherjee, M.**, Redfern, S. A. T., Zhang, M., and Harlov, D. E., 2002, Orientational order-disorder of ND₄⁺/NH₄⁺ in ND₄ phlogopite: an in situ low-temperature FTIR study, *European Journal of Mineralogy*, 14, 1033-1039.
 04. **Mookherjee, M.**, Redfern, S. A. T., Zhang, M., and Harlov, D. E., 2002, Orientational order-disorder of N(D,H)₄⁺ in tobelite, *American Mineralogist*, 87, 1868-1891.
 03. Zhang, M., Redhammer, G. J., Salje, E. K. H., and **Mookherjee, M.**, 2002, LiFeSi₂O₆ and NaFeSi₂O₆ at low temperatures: an infrared spectroscopic study, *Physics and Chemistry of Minerals*, 29, 609-616.
 02. **Mookherjee, M.**, and Redfern, S. A. T., 2002, Interlayer region and Si-O stretching in phengite 2M1: an in situ high-temperature FTIR study, *Clay Minerals*, 37, 309-321.
 01. **Mookherjee, M.**, Redfern, S. A. T., and Zhang, M., 2001, Thermal response of structure and hydroxyl ion of phengite 2M1: an in situ neutron diffraction and FTIR study, *European Journal of Mineralogy*, 13, 545-555.

Invited Presentations

07/2022 The Deep Hydrosphere
Department of Geology and Geophysics, Indian Institute of Technology,

Kharagpur, India
 07/2022 The Deep Hydrosphere
 Department of Geological Sciences, Jadavpur University, Kolkata, India
 04/2019 Volatiles in the Solid Earth- Insights from Mineral Physics.
 Department of Geosciences, Stony Brook University
 07/2018 Mineral Physics- Effects of Water
 CIDER (Cooperative Institute for Dynamic Earth Research) Kavli Institute,
 University of California, Santa Barbara.
 04/2017 Volatiles in the Solid Earth- Insights from Mineral Physics.
 Department of Earth and Planetary Sciences, Northwestern University
 10/2015 Volatiles in the Solid Earth- Atomic to Global.
 Department of Earth Sciences, ETH, Zurich, Switzerland
 04/2015 The Deep Hydrosphere- atomistic to global.
 Louisiana State University, Baton Rouge, LA.
 02/2015 The Deep Hydrosphere- atomistic to global.
 Florida State University, Tallahassee, FL.
 01/2015 The Deep Hydrosphere- atomistic to global.
 Indian Institute of Science Research & Education, Kolkata, India.
 11/2014 The Deep Hydrosphere- insights from mineralogical investigations. Natural
 History Museum, Oslo, Norway.
 12/2013 Volatiles in the Solid Earth- Atomic to Global.
 Universität zu Köln, Köln, Germany.
 11/2013 The Deep Hydrosphere- insights from Mineral Physics.
 Princeton University, NJ, USA.
 07/2013 The Deep Water Cycle- insights from Mineral Physics.
 Institute for Mineralogy of the Universität Münster, Germany.
 04/2013 The Deep Water Cycle- insights from Mineral Physics.
 Cornell University, Ithaca, NY, USA.
 03/2013 The Deep Water Cycle- insights from Mineral Physics.
 University of Liverpool, Liverpool, UK.
 03/2013 The Deep Hydrosphere.
 University of Cambridge, Cambridge, U.K.
 03/2013 Subduction Zones- insights from Mineral Physics.
 University of Rochester, NY, USA.
 03/2013 Water in the Solid Earth.
 University of Rochester, NY, USA.
 02/2013 The Deep Hydrosphere.
 Boston University, MA, USA.
 02/2013 Subduction Zones- insights from Mineral Physics.
 Boston University, MA, USA.
 02/2013 Hydrous phases in subduction zone settings.
 Binghamton University, NY, USA
 11/2012 The Deep Hydrosphere.
 Rochester University, NY, USA.

- 11/2012 The Deep Hydrosphere: Nominally Anhydrous Minerals & Hydrous Silicate Melts.
Syracuse University, NY, USA.
- 04/2012 Mantle hydration and melting: insights from Mineral Physics
Geophysical Laboratory, Washington DC, USA.
- 06/2011 Fluids and Melts in the Earth's interior
Cornell University, Ithaca, NY, USA.
- 04/2011 Crust to Core: Geophysical implications of Volatile bearing Earth Materials.
University of Maryland, College Park, MD, USA.
- 04/2011 Crust to Core: Physics and Chemistry of Volatile bearing Earth Materials.
Rice University, Houston, TX, USA.
- 01/2011 Fluids, Melts, and Volatiles in the deep Earth
Indian Institute of Science, Bangalore, India
- 11/2010 Fluids and Melts in the Earth's Interior
Department of Earth Sciences, ETH, Zurich, Switzerland
- 10/2010 Energetics, Structure, and Elasticity of Subducted Materials
Ludwig-Maxmilians-Universität, Munich, Germany.
- 10/2009 Volatiles in the Earth's interior
University College London, London, UK
- 01/2009 Water in the Earth Materials
Indian Institute of Technology, Bombay, India
- 11/2007 Water in the Earth Materials
Lamont Geochemistry Seminar Series, Columbia University, NY, USA
- 10/2007 Water in the Earth Materials
Bayerisches Geoinstitut, Bayreuth, Germany
- 05/2005 High-pressure behavior of Hydrous Phases
Yale University, New Haven, CT, USA
- 05/2005 High-pressure behavior of Hydrous Phases
Indiana University, Bloomington, IN, USA
- 05/2005 High-pressure behavior of Hydrous Phases
Virginia Tech, Blacksburg, VA, USA
- 02/2002 Order-disorder in Hydrogen bearing Minerals
University of Michigan, Ann Arbor, MI, USA
- 02/2002 Order-disorder in Hydrogen bearing Minerals
Geophysical Laboratory, Carnegie Institution, Washington DC, USA

Conference Presentations

- 12/2022 Subduction zone anomalies: insights from the properties of hydrous minerals (Invited)
AGU, Fall Meeting, Chicago, IL, USA
- 12/2022 Pressure induced hydration in layered hydrous minerals in subduction zone
AGU, Fall Meeting, Chicago, IL, USA
- 12/2022 Structure and Properties of Silicate melts at extreme conditions (Invited)
2022 IUCr High-Pressure Workshop, Chicago, IL

10/2022 High-pressure behavior of layered hydrous minerals
Geological Society of America, Connects 2022, Denver, Co, USA

12/2017 Hydrogen in the deep Earth (Invited)
AGU, Fall Meeting, San Francisco, CA, USA

12/2016 High-pressure behavior of hydrous phases (Invited)
AGU, Fall Meeting, San Francisco, CA, USA

12/2014 Elasticity of Hydrous Phases in Subduction Zones- Geophysical Implications
(Invited)
AGU, Fall Meeting, San Francisco, CA, USA

12/2012 Electrical conductivity of fluids and hydrous phases at subduction zone
conditions
AGU, Fall Meeting, San Francisco, CA, USA

06/2012 Electrical conductivity of serpentine fluids at subduction zone conditions
Goldschmidt, Montreal, Canada

11/2011 Elasticity of hydrous silicates at high pressure: geophysical implications
Thermodynamix-III workshop, Dublin, Ireland

12/2010 The composition of hydrous partial melt at 410 km: Geodynamic
implications (Invited)
AGU, Fall Meeting, San Francisco, CA, USA

10/2010 Energetics, Structure and Elasticity of subducted materials
Computational Mineral Physics: Application to Geophysics
Centre Europeen de Calcul Atomique et Moleculaire (CECAM), Zurich

04/2010 Aluminate speciation at high pressures and temperatures
Experimental, Mineralogy, Petrology and Geochemistry, EMPGXIII

12/2009 H₂O and CO₂ bearing silicate melts at high-pressures (Invited)
AGU, Fall Meeting, San Francisco, CA, USA

12/2009 In-situ Raman spectroscopic study of aluminate speciation in H₂O-KOH
solutions at high pressures and temperatures
AGU, Fall Meeting, San Francisco, CA, USA

06/2009 Structure and Elasticity of Hollandite
Goldschmidt Conference, Davos, Switzerland

06/2009 Structure and Elasticity of Hollandite
Crust to Core, European Union Meeting, Sevilla, Spain

11/2008 Structure and Elasticity of Serpentine
Ab initio calculation in Geosciences, Cracow, Poland

12/2007 Hydrogen Solubility in Garnet at High-Pressure
AGU, Fall Meeting, San Francisco, CA, USA

12/2006 High-pressure behavior of serpentine and elasticity systematics of hydrous
and nominally anhydrous phases
AGU, Fall Meeting, San Francisco, CA, USA

03/2006 Water in MgSiO₃ melts at high-pressure
American Physical Society, Baltimore, MD, USA

12/2005 Water in MgSiO₃ melts at high-pressure
AGU, Fall Meeting, San Francisco, CA, USA

08/2004 Equation of state and transition pressure of brucite dehydration: a
theoretical approach

- 12/2003 European Conference on Mineralogy and Spectroscopy, Vienna, Austria
First-principles study of olivine solid solution
AGU, Fall Meeting, San Francisco, CA, USA
- 09/2001 Orientational order-disorder behavior of ammonium ion in silicates
European Conference on Mineralogy and Spectroscopy, Paris, France

Awards & Fellowships

- 2023 Fellow, Mineralogical Society of America
- 2018 National Science Foundation's Career Award
- 2017 Ralph E. Powe Junior Faculty Enhancement Award
Oak Ridge Associated Universities (ORAU)
- 2017 College of Arts and Sciences Dean's Faculty Travel Award
Florida State University
- 2016 First Year Assistant Professor Award, Florida State University

Teaching & Mentoring

Florida State University Undergraduate/Graduate Courses

- Mineralogy and Crystallography GLY 3200 (Fall 2022-2016)
- Advanced Topics in Geochem (Advanced Mineralogy) GLY 5297 (Spring 2022)
- Introduction to Geophysics GLY 4451/5455 (Spring 2021, 2018)
- Physical Geology GLY 2010 (Spring 2023, 2020, 2019, 2017)

Post-doctoral Scholars

Dr. Abhisek Basu (2018-present); Dr. Suraj Bajgain (2016-2022; now visiting Assistant Professor at Lake Superior State University, Sault Saint Marie, MI); Dr. Gaurav Shukla (2017; now Assistant Professor at IISER Kolkata, India); Dr. Sumudu Tennakoon (2016-2017; Apex Analytics, North Carolina)

Graduate Students

Mr. Aaron W. Ashley (2019- present; Ph.D. candidate, FSU); Dr. Ye Peng (2016-2021 Pan Post-doctoral Fellow at Rice University; recipient of 2022 Mineral and Rock Physics Grad. Student Award, American Geophysical Union)

Undergraduate Students

Ms. Emily Wilder (2022-2023); Ms. Camila Mejia (2022), Ms. Marissa Miller (2022), Mr. George Zhang (2022, summer intern at FSU; cadet at the United States Military Academy at West Point); Ms. Ericka McMahan (2020-2021; currently MS student, FSU); Mr. Stephen Clapp (2019-2020; currently MS student, FSU); Ms. Vlada Fillipova (2018; currently grad student, Univ of Washington); Ms. Rachel Glanton (2018; FSU); Ms. Brittany Duffey (2017-2018; UROP, currently MS student, FSU), Mr. Kevin Bower (2017-2018), Mr. Jack Levy (2017-2018), Mr. Ian McQuaig (2017-2018), Mr. James Eke (2017, FSU); Ms. Kariza Hossain (2016-2017; UROP); Ms. Emma Kavlan (2016), Mr. Songlin Liu (2016; visiting intern USTC China); Mr. Anant Hariharan (2015; Cornell University, now at

Ph.D. student at Brown University); Ms. Tanvi Chheda (2013; Cornell University, Ph.D. Stanford University)

High-School Student interns

Mr. Matthew Solomon (2018; YSP, FSU; now undergraduate student at Brown University); Ms. Trishala Kumar (2018; YSP, FSU; now undergraduate student at Princeton University); Mr. Luis Andreu (2017; YSP, FSU); Mr. Fernando Rivera (2017; YSP, FSU); Ms. Dhenu Patel (2016, FSU, now undergraduate student at FSU)

Service to Florida State University

2019-present Geology Graduate Advising Chair
2020-2021 Chair of the Geophysics Faculty Search Committee
2019-2020 Chair of the Solid Earth Geosciences Faculty Search Committee
2017-2018 Member of the Geophysics Faculty Search Committee
2016 Member of the Earth, Ocean and Atmospheric Sciences Website Committee

Service to the Profession

Associate Editor:

2022-present Scientific Reports- Interdisciplinary Journal across all areas of natural sciences, psychology, medicine, and engineering (Springer Nature)
2016-present American Mineralogist- Journal of Earth and Planetary Materials
Flagship Journal for Mineralogical Society of America
2015-present Frontiers in Earth Sciences: Earth and Planetary Materials

Conference Sessions & Theme:

2017 Fall AGU : “Elastic and Transport Properties of Core and Mantle Materials”
(Co-Session Chair Dr. Jiachao Liu, Dr. Hauke Marquardt, Dr. Stephen Stackhouse)
2017 Fall AGU: “Slabs in the Mantle and the Fate of the Subducted Material”
(Co-Session Chair Dr. Caroline Eakin, Dr. Fabio Crameri)
2016 Fall AGU: “Slabs in the Mantle and the Fate of the Subducted Material”
(Co-Session Chair Dr. Caroline Eakin, Dr. Fabio Crameri, Prof. Ikuo Katayama)
2016 European Mineralogical Conference: “Advances in computational and experimental mineralogy: A journey from the surface to the deep Earth and beyond”
(Co-Session Chair Dr. Paola Comodi, Dr. Azzurra Zucchini, and Dr. Catherine McCammon)
2015 Goldschmidt: Theme: “Frontiers in Analytical and Computational Techniques”
(Coordinator Prof. Udo Becker)

- 2015 Goldschmidt: “Physics and Chemistry of Earth Materials -Insights from Simulations and Experiments”
(Co-Session Chair Dr. Sandro Jahn, Dr. Jun Tsuchiya)
- 2012 Fall AGU: “Fluids and Hydrous Phases in Subduction Zones”
(Co-Session Chair Prof. Ikuo Katayama, Prof. Maureen Long, Dr. Manuele Faccenda)
- 2012 Goldschmidt: “Deep cycles of volatiles in terrestrial planets through time”
(Co-Session Chair Prof. Rajdeep Dasgupta and Dr. Nobumichi Shimizu)
- 2011 Fall AGU: “Earth Materials Under Compression: Advances in Experimental and Numerical Methods”
(Co-Session Chair Prof. S. Merkel, Dr. Y. Wang, Dr. G. Steinle-Neumann)
- 2010 Fall AGU: “Stability, Elasticity, and Rheology of Hydrous Phases: Geodynamical Implications”
(Co-Session Chair Prof. B. Reynard and Prof. I. Katayama)
- 2007 Fall AGU: “Advances in Computational Studies of Earth Materials”
(Co-Session Chair Prof. T. Tsuchiya and Prof. B. Karki)

Reviewer for Grants:

- Division of Earth Sciences, National Science Foundation
 - Petrology and Geochemistry Program,
 - Geophysics Program, and
 - Earth Sciences-post doctoral fellowship Program
- Deutsche Forschungsgemeinschaft (German Science Foundation), Germany
- Natural Environmental Research Council, U.K.

Reviewer for Journal Articles:

American Mineralogist, Earth and Planetary Science Letters, European Journal of Mineralogy, Geochimica Cosmochimica Acta, Geology, Geophysical Journal International, Geophysical Research Letters, Mineralogical Magazine, Nature Geoscience, Nature Communications, Scientific Reports, Physics and Chemistry of Minerals, Physics of Earth and Planetary Interiors, Journal of Applied Physics, Journal of Geophysical Research-Solid Earth, Science, and Tectonophysics

Service to the Profession:

Committee member for MSA Lecture Program (2022-2024); Committee member for Kraus Crystallographic Research Grant, Mineralogical Society of America (2019-2022)
Evaluator/Judge: Outstanding Student Paper Award, AGU (2017)