NICHOLAS J. DYGERT

Department of Earth, Environmental and Planetary Sciences | University of Tennessee
ndygert1@utk.edu | (865) 974 6022 | https://dygert.utk.edu/ | 1278 Citations | h-index 19

Research Interests

Using experiments, analyses of natural materials, numerical models, and field observations to understand dynamic processes in planetary interiors. Petrogenesis and high-temperature geochemistry. Melt migration and melt-rock reaction. Rheological properties of minerals and melts, two phase flow. Trace element partitioning. Earth and Planetary science.

Academic Appointments

Present	**Lawrence and Dawn Taylor Associate Professor** Department of Earth and Planetary Sciences, University of Tennessee
2019 – 2023	**Lawrence and Dawn Taylor Assistant Professor** Department of Earth and Planetary Sciences, University of Tennessee
2017 – 2019	**Assistant Professor** Department of Earth and Planetary Sciences, University of Tennessee
2015 – 2017	**Distinguished Postdoctoral Fellow** Department of Geological Sciences, University of Texas at Austin Mentors: Whitney M. Behr, Marc A. Hesse, Jung-Fu (Afu) Lin

Academic Preparation

2015	**Ph.D.,** Brown University Experimental petrology, geochemistry, rock deformation Advisors: Yan Liang and Greg Hirth; Committee: Steven W. Parman, E. Marc Parmentier, Peter B. Kelemen Thesis: Experimental and field constraints on the physicochemical evolution of the terrestrial and lunar mantles
2007	**B.S.,** *cum laude*, University of Rochester Major: Geochemistry, Minor: History Advisors: Asish R. Basu and Carmala N. Garzione Thesis: Petrochemistry of the Jayu Khota crater, Bolivian Altiplano

Publications

‡ graduate student advised by Dygert; † undergraduate; § postdoc

37. ‡Mouser, M.D., **Dygert**, N., 2025. An experimental study of clinopyroxene- and garnet-melt trace element partitioning in Fe-rich basaltic systems. *Advances in Geochemistry and Cosmochemistry*, doi:10.33063/agc.v1i2.719.
36. **Dygert**, N., Jansen, M., 2025. On the significance of thermal histories of ophiolitic and abyssal peridotites. *Lithos* Oman Drilling Project Special Issue, doi:10.1016/j.lithos.2025.108152.
35. **Dygert**, N., ‡Ji, D., ‡Etheridge, E.N, 2025. A predictive model for divalent element partitioning between clinopyroxene and basaltic melt and a Europium-in-Plagioclase-Clinopyroxene Oxybarometer for cumulate rocks. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2025.02.003.
34. Ren, J., Hesse, M.A., **Dygert**, N., §Lucas, M.P., 2024. Deterministic model for asteroid thermal evolution with fragmentation and reassembly into a rubble pile. *Journal of Geophysical Research – Planets*, doi:10.1029/2023JE007898.

33. ‡Scholpp, J.L., **Dygert**, N., 2024. Experimental insights into the mineralogy and melt-rock reactions produced by lunar cumulate mantle overturn. *Contributions to Mineralogy and Petrology*, doi:10.1007/s00410-024-02134-z.
32. **Dygert**, N., Ustunisik, G.K., Nielsen, R.L., 2024. Europium in plagioclase reveals mantle melting modulates oxygen fugacity. *Nature Communications*, doi:10.1038/s41467-024-47224-5.
31. ‡Ji, D., **Dygert**, N., 2024. Trace element partitioning between apatite and silicate melts: Effects of major element composition, temperature, and oxygen fugacity, and implications for the volatile element budget of the lunar magma ocean. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2023.11.004.
30. Gaffney, A.M., Gross, J., Borg, L.E., Donaldson Hanna, K.L., Draper, D.S., **Dygert**, N., Elkins-Tanton, L.T., Prissel, K.B., Prissel, T.C., Steenstra, E.S., van Westrenen, W., 2023. Magmatic Evolution I: Initial Differentiation of the Moon. *Reviews in Mineralogy and Geochemistry* 89, New Views of the Moon, doi:10.2138/rmg.2023.89.03.
29. ‡Mouser, M.D., **Dygert**, N., 2023. On the potential for cumulate mantle overturn in Mercury. *Journal of Geophysical Research – Planets*, doi:10.1029/2023JE007739.
28. ‡Ji, D., **Dygert**, N., 2023. Trace element evidence for serial processing of the lunar flotation crust and a depleted bulk Moon. *Earth and Planetary Science Letters*, doi:1016.j.epsl.2022/117958.
27. §Lucas, M.P., **Dygert**, N., Ren, J., Hesse, M.A., Miller, N.R., McSween, H.Y., 2022. Thermochemical evolution of the acapulcoite-lodranite parent body: Evidence for fragmentation-disrupted partial differentiation. *Meteoritics and Planetary Science*, doi:10.1111/maps.13930.
26. Wilbur, Z.E., Udry, A., McCubbin, F.M., Vander Kaaden, K.E., DeFelice, C., Ziegler, K., Ross, D.K., McCoy, T.J., Gross, J., Barnes, J.J., **Dygert**, N., Ziegler, R.A., Turrin, B.D., McCoy, C., 2022. The effects of highly reduced magmatism revealed through aubrites. *Meteoritics and Planetary Science*, doi:10.1111/maps.13823.
25. Ren, J., Hesse, M.A., §Lucas, M.P., **Dygert**, N.J., 2022. On the cooling rate evolution of asteroidal fragments. *Icarus*, doi:10.1016/j.icarus.2022.114905.
24. Kourim, F., Rospabé, M., **Dygert**, N., Chatterjee, S., Takazawa, E., Wang, K-L., Godard, M., Benoit, M., Giampoura, M., Teagle, D. A., Kelemen, P. B., Oman Drilling Project Phase 2 Science Party 2022. Melt/fluid-rock interaction beneath oceanic spreading centers: Insights from the geochemical characterization of the Oman Crust-Mantle transition zone, holes CM1A and CM2B. *Journal of Geophysical Research – Solid Earth* (Oman Drilling Project special issue), doi:10.1029/2021JB022694.
23. ‡Grambling, N.L., **Dygert**, N., †Boring, B., Jean, M.M., Kelemen, P.B., 2022. Thermal history of lithosphere formed beneath fast spreading ridges: Constraints from the Mantle Transition Zone of the East Pacific Rise at Hess Deep and Oman Drilling Project, Wadi Zeeb, Samail ophiolite. *Journal of Geophysical Research – Solid Earth* (Oman Drilling Project special issue), doi:10.1029/2021JB022696.
22. ‡Mouser, M.D., **Dygert**, N., §Anzures, B.A., ‡Grambling, N.L., Hurbiak, R., Kono, Y., Shen, G., Parman, S., 2021. Experimental investigation of Mercury's magma ocean viscosity: Implications for the formation of Mercury's cumulate mantle, its subsequent dynamic evolution, and crustal petrogenesis. *Journal of Geophysical Research – Planets*, doi:10.1029/2021JE006946.
21. Kourim, F., Wang, K.-L., Beinlich, A., Chieh, C.-J., **Dygert**, N., Lafay, R., Kovach, V., Michibayashi, K., Yarmolyuk, V., Izuka, Y., 2021. Metasomatism of the off-cratonic lithospheric mantle beneath Hangay Dome, Mongolia: Constraints from trace-element modelling of lherzolite xenoliths. *Lithos*, doi:10.1016/j.lithos.2021.106407.
20. Moriarty, D.P., **Dygert**, N., Valencia, S.N., Watkins, R.N., Petro, N.E., 2021. The Search for Lunar Mantle Rocks Exposed on the Surface of the Moon. **Invited review** for *Nature Communications*, doi:10.1038/s41467-021-24626-3.
19. Moriarty, D.P., Watkins, R.N., Valencia, S.N., Kendall, J.D, Evans, J.A., **Dygert**, N., Petro, N.E., 2021. Evidence for a stratified upper mantle preserved within the South Pole Aitken Basin. *Journal of Geophysical Research – Planets*, doi:10.1029/2020JE006589.
18. Tokle, L., Hirth, G., Raterron, P., Liang, Y., **Dygert**, N., 2021. The effect of pressure and Mg-content on ilmenite rheology: Implications for lunar cumulate mantle overturn. *Journal of Geophysical Research – Planets*, doi:10.1029/2020JE006494.

17. §Lucas, M., **Dygert**, N., Ren, J., Hesse, M., Miller, N., McSween, H., 2020. Evidence for early fragmentation-reassembly of ordinary chondrite (H, L, and LL) parent bodies from REE-in-two-pyroxene thermometry. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2020.09.010.
16. **Dygert**, N., Draper, D., Rapp, J., Lapen, T., Fagan, A. Neal, C.R., 2020. Experimental determinations of trace element partitioning between plagioclase, pigeonite, olivine and lunar basaltic melts and an fO_2 dependent model for plagioclase-melt Eu partitioning. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2020.03.037.
15. Zhang, Y., Nelson, P., **Dygert**, N., Lin, J.F., 2019. Fe alloy slurry and a compacting cumulate pile across Earth's inner-core boundary. *Journal of Geophysical Research – Solid Earth*, doi:10.1029/2019JB017792.
14. Li, H., Zhang, N., Liang, Y., Wu, B., **Dygert**, N., Huang, J., Parmentier, E.M., 2019. Lunar Cumulate Mantle Overturn: A New Model Constrained by Ilmenite Rheology. *Journal of Geophysical Research – Planets*, doi:10.1029/2018JE005905.
13. **Dygert**, N., Bernard, R.E., Behr, W.M., 2019. Great Basin mantle xenoliths record deformation associated with active lithospheric downwelling. *Geochemistry, Geophysics, Geosystems*, doi:10.1029/2018GC007834.
12. Catlos, E.J., †Pease, E.C., **Dygert**, N., Brookfield, M., Bhutani, R., Pandle, K., Schmitt, A., 2019. Nature, age, and emplacement of the Spongtang ophiolite, Ladakh, NW India., *Journal of the Geological Society of London*, doi:10.1144/jgs2018-085.
11. **Dygert**, N., Jackson, C.R.M., Hesse, M.A., Tremblay, M.M., Shuster, D.L., †Gu, J.T., 2018. Plate tectonic cycling modulates Earth's $^{3}He/^{22}Ne$ ratio. *Earth and Planetary Science Letters*, doi:10.1016/j.epsl.2018.06.044.
10. **Dygert**, N., Marshall, E., Lin, J.F., Kono, Y., Gardner, J., 2017. A low viscosity lunar magma ocean forms a stratified anorthitic flotation crust with mafic poor and rich units. *Geophysical Research Letters*, doi:10.1002/2017GL075703.
9. **Dygert**, N., Kelemen, P., Liang, Y., 2017. Spatial variations in cooling rate in the mantle section of the Samail ophiolite in Oman: Implications for formation of lithosphere at mid-ocean ridges. *Earth and Planetary Science Letters*, doi:10.1016/j.epsl.2017.02.038.
8. Zhang, N., **Dygert**, N, Liang, Y., Parmentier, M., 2017. The effects of ilmenite viscosity on the dynamics and evolution of an overturned lunar cumulate mantle. *Geophysical Research Letters*, doi: 10.1002/2017GL073702.
7. **Dygert**, N., Liang, Y., Kelemen, P., 2016. Formation of plagioclase lherzolite and associated dunite-harzburgite-lherzolite sequence by multiple episodes of melt percolation and melt-rock reaction: An example from Trinity ophiolite. *Journal of Petrology*, doi:10.1093/petrology/egw018.
6. **Dygert**, N., Hirth, G., Liang, Y., 2016. A flow law for ilmenite in dislocation creep: Implications for lunar cumulate mantle overturn. *Geophysical Research Letters*, doi:10.1002/2015GL066546.
5. Wang, C., Liang, Y., **Dygert**, N., Xu, W., 2016. Formation of orthopyroxenite by reaction between peridotite and hydrous basaltic melt: An experimental study. *Contributions to Mineralogy and Petrology*, doi:10.1007/s00410-016-1287-z.
4. **Dygert**, N. and Liang, Y., 2015. Temperatures and cooling rates recorded in REE in coexisting pyroxenes in ophiolitic and abyssal peridotites. *Earth and Planetary Science Letters*, doi:10.1016/j.epsl.2015.02.042.
3. **Dygert**, N., Liang, Y., Sun, C., Hess, P., 2014. An experimental study of trace element partitioning between augite and Fe-rich basalts. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2014.01.042.
2. Wang, C.G., Liang, Y., Xu, W.L., **Dygert**, N., 2013. Interaction between pyroxenite-derived melt and peridotite: laboratory dissolution experiments with applications to mineral compositional variations in mantle xenoliths from the North China Craton. *Contributions to Mineralogy and Petrology*, doi:10.1007/s00410-013-0938-6.
1. **Dygert**, N., Liang, Y., Hess, P., 2013. The importance of melt TiO_2 in affecting high field strength element partitioning between Fe-Ti oxides and lunar picritic glass melts. *Geochimica et Cosmochimica Acta*, doi:10.1016/j.gca.2012.12.005.

Manuscripts in Revision

Manuscripts in Review

‡Scholpp, J.L., **Dygert**, N. Trace element and isotopic evolution of the lunar interior during magma ocean solidification, cumulate overturn and subsequent melting: Insights into lunar melt sources. *Journal of Geophysical Research – Planets* (minor revision submitted).

Manuscripts in Preparation

Stern, R.J., **Dygert**, N., et al. ROVing in the Deep: Deep Sea Exploration of the Challenger Deep Forearc Segment (S. Mariana Convergent Margin) using Remotely-Operated Vehicle Jason/Medea.

Elnur, M., Alshibli, K., **Dygert**, N., et al. Kingsport Limestone as a CO_2 Caprock: Performance under Prolonged Laboratory scCO_2-Brine Exposure.

‡Grambling, N.L., Tokle, L., **Dygert**, N., Hirth, G., Liang, Y. Rheological and microstructural analysis of ilmenite-olivine aggregates deformed in shear: Implications for lunar mantle convection.

Harding, J., Van Avendonk, H., Hayman, N., **Dygert**, N. Reconciling seismic crustal thickness with magma supply at an ultraslow spreading center.

Books

McSween, H.Y., **Dygert**, N., et al. Planetary Geoscience, 2nd ed., *Cambridge University Press*. Lead author of Chapter 17, Integrated Planetary Geoscience: A Case Study (Moon); Contributing author to Chapter 6, Planetary Heating and Differentiation, and Chapter 7, Unseen Interiors.

Unrefereed Publications and White Papers

Neal, C., Pieters, C., Abbud-Madrid, A., Burns, J., Donaldson Hanna, K., **Dygert**, N., et al., 2021. Long-Term Commitment to Explore and Sustain our Earth-Moon Environment. Planetary Science and Astrobiology Decadal Survey 2023-2032 White Paper 401, *Bulletin of the American Astronomical Society*, doi:10.3847/25c2cfeb.200ff1a8.

Kelemen, P.B., Matter, J.M., Teagle, D.A.H, Coggon, J.A. and the **Oman Drilling Project Science Team**, 2021. Site CM2: Crust-Mantle Transition Zone and into upper mantle. In: *Proceedings of the Oman Drilling Project*, doi:10.14379/OmanDP.proc.2020.

Dygert, N., 2020. Exploration of lunar dynamic evolution using samples returned from the lunar South Pole. *Artemis Science Definition Team White Papers*, #2085.

Lassiter, J., **Dygert**, N., et al., 2016. What makes a planet "habitable" for the long haul? *UT Austin 'Bridging Barriers' program*.

Conference Abstracts

‡Etheridge, E., **Dygert, N**., Anderson, M., ‡Bogdan, A., Chin, E.J., Harigane, Y., ‡Denny, G., et al., 2025. Exploring chemical variations and thermal history of the lower crust and upper mantle within the Mariana Trench: Signatures of subduction? *AGU Fall Meeting*, V51E-0082.

Stern, R.J., Pujana, I., Anderson, M., Chin, E.J., **Dygert**, N., et al., 2025. ROVing in the Deep: Jason/Medea investigates the Challenger Deep Forearc Segment, southern Mariana Arc, W. Pacific. *AGU Fall Meeting*, T43D-0175 (presenting author).

Dygert, N., 2025. Lunar and lunar-relevant applications of a new Eu-in-plagioclase-clinopyroxene oxybarometer. *NASA Exploration Science Forum*, Albuquerque.

‡Scholpp, J.L., Sumino, H., **Dygert**, N., †Wilkerson, O.D., et al., 2025. He isotope evidence of a primitive mantle source beneath the Tristan-Gough-Walvis hotspot track. *Goldschmidt Conference, Prague*, #28534.

Dygert, N., ‡Etheridge, E.N., †Huk, R.E., ‡Ji, D., 2025. Applications of a new Eu-in-plagioclase-clinopyroxene oxybarometer. *Goldschmidt Conference, Prague*, #27264.

Okumura, T., Miyazaki, J., Kawaguchi, S., Tasumi, E., Takai, K., Umiko, H., Anderson, M., Chin, E., **Dygert**, N., Le Roux, V., Leybourne, M., Ohara, Y., Pujana, I., Stern, B., TN438 on board scientists and students., 2025. Fluid sampling attempts in the deepest serpentinite-hosted vent site, Shinkai Seep Field: Revisiting after 8 years. JpGU Meeting 2025.

Dygert, N., ‡Ji, D., ‡Etheridge, E., 2025. A Eu-in-Plagioclase-Clinopyroxene Oxybarometer for Cumulate Rocks. *19th International Symposium on Experimental Mineralogy, Petrology and Geochemistry*, Orleans, France.

‡Etheridge, E., **Dygert**, N., 2025. REE Distributions in Aubrites Demonstrate Intrasample Heterogeneity and Complex Geologic Histories. *Lunar and Planetary Science Conference, LVII*, #2736.

‡Scholpp, J.L., **Dygert**, N., 2025. Constraining the Origin of Eu Anomalies in High-Ti Lunar Melt Sources Using fO_2 Dependent Eu Partitioning Models: Implications for Plagioclase Flotation Efficiency During Lunar Crustal Formation. *Lunar and Planetary Science Conference, LVII*, #2156.

Dygert, N., 2025. The potential for silicate liquid immiscibility in the lunar magma ocean: A REE, and Nd and Hf isotope perspective. *Lunar and Planetary Science Conference, LVI*, #1015.

†Marshall, J., **Dygert**, N., 2024. Phase equilibria constraints on Mercury's cumulate mantle after magma ocean solidification. *Lunar and Planetary Science Conference, LV*, #2544.

Dygert, N., ‡Ji, D., ‡Etheridge, E., 2024. Toward a clinopyroxene-plagioclase oxybarometer for lunar and terrestrial cumulates: An fO_2-dependent predictive model for clinopyroxene-melt Eu partitioning. *Lunar and Planetary Science Conference, LV*, #2419.

‡Ji, D., **Dygert**, N., 2024. A new Europium in apatite-plagioclase oxybarometer for lunar and terrestrial cumulate rocks and meteorites. *Lunar and Planetary Science Conference, LV*, #1240.

‡Scholpp, J.L, **Dygert**, N., 2024. A petrogenetic model-based evaluation of the lunar K/Th ratio: Implications for the Moon's thermal evolution. *Lunar and Planetary Science Conference, LV*, #1113.

Wang, P., Hong, P., Bass, K., **Dygert**, N., et al., 2024. Experimenting with emerging artificial intelligence and augmented reality technologies utilizing planetary science data for STEM education and public outreach. *Lunar and Planetary Science Conference, LV*, #1338.

‡Mouser, M., **Dygert**, N., 2023. Understanding the evolution of Fe-rich mafic systems through pyroxene- and garnet-melt trace element partitioning experiments. *AGU Fall Meeting* MR13C-0056.

†Wilkerson, O., ‡Scholpp, J.L., **Dygert**, N., Nelson, W., Shervais, J., Tshiningayamwe, M., and Expedition 391 Scientists, 2023. Mineral chemistry and petrologic observations from IODP Expedition 391 lavas suggest a complex magmatic plumbing system. *AGU Fall Meeting* (withdrawn after first author passed away).

Dygert, N., Jansen, M., 2023. What can we learn from apparently divergent thermal histories of mantle peridotites from ophiolitic and amagmatic mid-ocean ridge spreading centers? *GSA Fall Meeting, Pittsburgh*, #391678.

Hatcher, R.D., Stigall, A.L., Engel, A.S., Dunne, W.M., **Dygert**, N., et al., 2023. Micah John Jessup's contributions to the University of Tennessee-Knoxville. *GSA Fall Meeting, Pittsburgh*, #395153.

Lucas, M.P., **Dygert**, N., Ren, J., Hesse, M.A., Miller, N.R., McSween, H.Y., 2023. Thermochemical evolution of the acapulcoite-lodranite parent body: Evidence for fragmentation-disrupted partial differentiation. *Asteroids, Comets, and Meteors Conference*, Flagstaff.

Dygert, N., ‡Ji, D., 2023. Serial processing of the lunar crust after the magma ocean stage and a depleted bulk Moon: Insights from a Europium-in-plagioclase partitioning model. *Goldschmidt Conference, Lyon*, #17023.

Elnur, M., Alshibli, K., **Dygert**, N., Lanzirotti, A., Newville, M., Zhang, R., Lu, H., Govindarajan, S, 2023. Geochemical interaction between CO_2 and caprock for safe carbon sequestration. *Symposium on Energy Geotechnics*.

‡Scholpp, J.L., **Dygert**, N., 2023. Hybridization of lunar mantle sources by garnet-bearing cumulates during overturn reconciles the REE, and Nd and Hf isotopic characteristics of high-Ti basalts. *Lunar and Planetary Science Conference, LIV*, #1569.

‡Scholpp, J.L., **Dygert**, N., 2023. Super- and subsolidus experiments exploring interactions between ilmenite-bearing cumulates and ambient lunar mantle during cumulate overturn: Mantle hybridization and garnet stability. *Lunar and Planetary Science Conference, LIV*, #1563.

‡Ji, D., **Dygert**, N., 2023. New experimental constraints on REE partitioning between apatite and silicate melts and a temperature and composition-dependent predictive partitioning model. *Lunar and Planetary Science Conference, LIV*, #1255.

Etheridge, E.N., §Anzures, B.A., **Dygert**, N., Goodrich, C.A., McCubbin, F.M., Righter, M., Jakubek, R., Fries, M. 2023. Thermal evolution of enstatite chondrite and aubrite parent bodies: Constraints from silicate geothermometry. *Lunar and Planetary Science Conference, LIV,* #2590.

‡Mouser, M.M., **Dygert**, N., 2022. From magma ocean to crust: Understanding Mercury's internal evolution and subsequent crustal formation through experiments and models. GSA Fall Meeting, #376941.

§Anzures, B.A., McCubbin, F.M., **Dygert**, N., Barnes, J.J, Boyce, J.W., 2022. Elucidating the origin and evolution of winonaite and IAB iron meteorite parent bodies through application of silicate geospeedometry and apatite characterization. *85th Meteoritical Society Meeting*.

Hammer, J., Baker, L., Barclay, J., Carrol, M.R., Coombs, M., Cottrell, E., **Dygert**, N., Elkins-Tanton, L., First, E., Gardner, J., Goldsby, D., Greenwood, J., Johnson, M., Krawczynski, M., Mandeville, C., McCanta, M., Minitti, M.E., Nelson, W., Prissel, T., Venezky, D., Weitz, C., Woodruff, D., 2022. How to build a legacy of scientific leadership: the HR formula. *Goldschmidt Conference*.

†Hooper, N.J., **Dygert**, N., Hrubiak, R., Monteleone, B.D., §Anzures, B.A., 2022. Experimental evidence for liquid iron alloy flotation on silicate melt. *Lunar and Planetary Science Conference, LIII*, #2724.

‡Grambling, N.L., Tokle, L., **Dygert**, N., Hirth, G., Chin, E., Liang, Y., Meyers, C., 2022. Rheological and microstructural investigation of ilmenite-olivine aggregates deformed in shear: Implications for lunar mantle cumulate overturn. *Lunar and Planetary Science Conference, LIII*, #2673.

§Anzures, B.A., **Dygert**, N., §Lucas, M.P., 2022. Thermochemical evolution of the Winonaite and IAB iron meteorite parent body. *Lunar and Planetary Science Conference, LIII*, #2696.

Ren, J., Hesse, M.A., Lucas, M.P., **Dygert**, N., 2022. Constraints on thermal evolution of asteroid fragments from high temperature cooling rates. *Lunar and Planetary Science Conference, LIII*, #2266.

‡Ji, D., **Dygert**, N., 2022. Serial processing after lunar anorthositic crust formation indicated by rare earth elements in plagioclase. *Lunar and Planetary Science Conference, LIII*, #1229.

‡Mouser, M.D., **Dygert**, N., 2022. Clinopyroxene-melt trace element partitioning in Fe- and Al-rich basaltic systems: Application to Nakhlite Petrogenesis. *Lunar and Planetary Science Conference, LIII*, #1100.

‡Scholpp, J.L., **Dygert**, N., 2022. Hybridization of the Lunar Mantle: Insights from Melt-Rock Reaction Experiments. *Lunar and Planetary Science Conference, LIII*, #1015.

Moriarty, D.P., Petro, N.E., Watkins, R.N., Valencia, S.N., Kendall, J.D., **Dygert**, N., Kean, J.T., 2021. Ancient lunar mantle ejecta preserved on the lunar farside. LPI Lunar Surface Science Workshop, #8022.

Grambling, T.A., Jessup, M.J., **Dygert**, N., Newell, D.L., ‡Grambling, N.L., Hiett, C., 2021. Over dispersion of zircon crystallization ages in the Cordillera Blanca batholith, Central Peru: Lead loss or prolonged magmatism and protracted crystallization? AGU Fall Meeting, V15A-0082.

Dygert, N., Ustunisik, G.K., Lewis, K., Nielsen, R.L., 2021. Application of a Eu-in-plagioclase-melt oxybarometer to phenocryst-host pairs and melt inclusions in MORBs reveals resolvable heterogeneity in oxygen fugacity. AGU Fall Meeting, DI23A-07.

Ren, J., **Dygert**, N., §Lucas, M.P., Hesse, M.A., McSween, H.Y., 2021. Rapid cooling of H, L, and LL chondrites and lodranite meteorites suggests collisional fragmentation of their parent bodies at peak or near-peak temperatures and long (10s-10,000s y) reassembly timescales. AGU Fall Meeting, DI35E-0092.

‡Ji, D., **Dygert**, N., 2021. Eu anomalies in lunar plagioclase reflect secondary processing by subsolidus reequilibration and introduction of a KREEP component. *Goldschmidt Conference*, #3219.

Parman, S., Anzures, B., Cukjati, J., Cooper, R., **Dygert**, N., Mouser, M., Ohldag, H., 2021. Silicon Bonding in Mercury's Magmas. *Mercury Exploration Analysis Group Meeting*, #6029.

§Lucas, M.P., **Dygert**, N., Miller, N.R., McSween, H.Y., 2021. New Major and Trace Element Data from Acapulcoite-Lodranite Clan Meteorites: Evidence for Melt-Rock Reaction Events and Early Collisional Fragmentation of the Parent Body. *Lunar and Planetary Science Conference, LII*, #1307.

‡Mouser, M.D., **Dygert**, N., 2021. Gravitational Instabilities in Mercury's Mantle Produce Diverse Volcanic Source Regions. *Lunar and Planetary Science Conference, LII*, #1482.

Ren, J., Hesse, M.A., §Lucas, M.P., **Dygert**, N., 2021. Asteroid Thermal Evolution with Fragmentation and Reassembly into a Rubble Pile. *Lunar and Planetary Science Conference, LII*, #2620.

Dygert, N., ‡Ji, D., Fagan, A.L., Neal, C.R., Draper, D.S., Rapp, J.F., Lapen, T.J., 2021. Petrogenesis of and Subsolidus Reequilibration within Lunar Ferroan Anorthosites: Two Demonstrations of a New fO_2-Dependent Model for Plagioclase-Melt Europium Partitioning. *Lunar and Planetary Science Conference, LII,* #2352.

‡Mouser, M.D., **Dygert**, N., Anzures, B.A., ‡Grambling, N.L., Hrubiak, R., Kono, Y., Shen, G., Parman, S.W., 2020. Viscosity of the Mercurian magma ocean: Implications for the Mineralogical Stratigraphy of Mercury's Juvenile Mantle and Crustal Petrogenesis. AGU Fall Meeting, P088-05.

‡Grambling, N.L., Boring, B., **Dygert**, N., Jean, M.M., 2020. Emplacement and cooling of the lower crust and upper mantle beneath two fast spreading ridge segments: A quantitative comparison of crustal gabbros and

mantle peridotites from Oman Drilling Project site CMA-1 and IODP Expedition 345 – Hess Deep. AGU Fall Meeting, V020-0002.

Ren, J., Hesse, M.A., §Lucas, M.P., **Dygert**, N., 2020. Asteroid thermal evolution with fragmentation and reassembly into a rubble pile. AGU Fall Meeting, P032-0004.

§Lucas, M.P., **Dygert**, N., Ren, J., Hesse, M.A., Miller, N.R., McSween, H.Y., 2020. Evidence for fragmentation-reassembly of ordinary chondrite (H, L, and LL) parent bodies from REE-in-two pyroxene thermometry. GSA Fall Meeting, #354714.

§Lucas, M.P., **Dygert**, N., Miller, N.R., McSween, H.Y., 2020. An application of REE-in-two-pyroxene thermometry to primitive achondrites: Illuminating the thermal histories of partially differentiated asteroids. *Lunar and Planetary Science Conference, LI,* #2699.

‡Mouser, M.D., **Dygert**, N., Hrubiak, R., Kono, Y., Shen, G., Anzures, B.A., ‡Grambling, N.L., Parman, S.W., 2020. Viscosity of the Mercurian magma ocean: Implications of sulfur-free and sulfur-bearing magma oceans for differentiation and crustal petrogenesis. *Lunar and Planetary Science Conference, LI,* #2098.

Dygert, N., Bernard, R.E., Behr, W.M., 2020. Strain localization and dynamic weakening within Rayleigh-Taylor instabilities: Insights from a terrestrial instability and implications for lunar cumulate mantle overturn. *Lunar and Planetary Science Conference, LI,* #1165.

†Hicks, T., **Dygert**, N., 2020. Exploring the Tectonic Controls on Thermal History of the Mantle Lithosphere of the Southwest of North America using Xenolith Geochemistry. Southeastern GSA Meeting, #344576.

‡Grambling, N.L., Tokle, L., **Dygert**, N., Hirth, G., Liang, Y., 2019. Rheological and microstructural analysis of ilmenite-olivine aggregates deformed in shear: Implications for lunar mantle convection. AGU Fall Meeting, MR51B-0057.

†Boring, B., **Dygert**, N., Harvey, R., Smye, A., 2019. Lithospheric Xenoliths Record Thermal and Magmatic Signature of Rift Development Beneath Ross Island, Antarctica. AGU Fall Meeting, V51F-0116.

Dygert, N., McCanta, M.C., 2019. Application of a new Eu-in-plagioclase-melt oxybarometer to MORBs and arc magmas. AGU Fall Meeting, V23B-04.

§Lucas, M.P., **Dygert**, N., Miller, N.R., McSween, H.Y., 2019. Evidence for fragmentation-reassembly of ordinary chondrite (H, L, and LL) parent bodies from REE-in-two pyroxene thermometry. AGU Fall Meeting, V51F-0115.

‡Mouser, M.D., **Dygert**, N., ‡Grambling, N.L., Anzures, B.A., Kono, Y., Shen, G., Parman, S., 2019. Viscosity of the Mercurian magma ocean: Implications for crystal fractionation and crustal petrogenesis. *Lunar and Planetary Science Conference, L,* #2030.

§Lucas, M.P., **Dygert**, N., Patchen, A.D., Miller, N.R., McSween, H.Y., 2019. An application of REE-in-two-pyroxene thermometry to H Chondrites: Evidence for early fragmentation-reassembly of the H Chondrite parent body. *Lunar and Planetary Science Conference, L,* #2495.

Dygert, N., Liang, Y., Hirth, G., Zhang, N., 2019. Viscous flow of ilmenite-bearing cumulates during lunar magma ocean solidification: Consequences for lunar evolution. *Lunar and Planetary Science Conference, L,* #2798.

Dygert, N., Bernard, R.E., Behr, W.M., 2018. Xenolith constraints on deformation conditions and mechanisms in lithospheric Rayleigh-Taylor instabilities. AGU Fall Meeting, MR41A-05 (**invited**).

‡Grambling, N.L., **Dygert**, N., Jean, M.M., 2018. Rapid cooling of the crust and mantle at Hess Deep is consistent with the Sheeted Sill model for accretion of oceanic crust, AGU Fall Meeting, V11B-05.

Python, M, Kopke, J., Payot, B.D., Guotana, J.-M., **Dygert**, N., ‡Grambling, N., Johnson, K.T.M., Park, G., Teagle, D.A.H., Takazawa, E., 2018. Drilling the crust-mantle transition at Oman Drilling Project sites CM1 and CM2. AGU Fall Meeting, V13E-0144.

Kourim, F., Rospabé, M., Giampouras, M., Chatterjee, S., Ishii, K., Tamura, A., **Dygert**, N., Oyangi, R., Wang, K.-L.., Benoit, M., Teagle, D.A.H., Takazawa, E., Kelemen, P.B., Coggon, J.A., 2018. First geochemical and mineralogical results of Oman crust-mantle transition: Holes CM1A and CM2B characterization aboard DV-Chikyu, Oman Drilling Project, Phase 2 Leg 3. AGU Fall Meeting, V13E-0166.

Dygert, N., Jackson, C.R.M., Hesse, M.A., Tremblay, M.M., Shuster, D.L., †Gu, J.T., 2018. Plate tectonic cycling modulates Earth's $^{3}He/^{22}Ne$ ratio, AGU Fall Meeting, V11G-0090.

Dygert, N., Bernard, R.E., Behr, W.M., 2018. Mantle xenoliths record deformation associated with active lithospheric downwelling beneath central Nevada. Southeast GSA Meeting, #312076.

Dygert, N., Patchen, A.D., Miller, N.R., McSween, H.Y., 2018. An application of REE-in-two-pyroxene thermometry to LL Chondrites: Evidence for multistage metamorphism and a rubble pile parent body. *Lunar and Planetary Science Conference, XLIX*, #1750.

†Pease, E., **Dygert**, N., Catlos, E.J., Brookfield, M., 2017. Timing of obduction, tectonic affinity, and cooling history of the Spongtang ophiolite, Northwest India, Himalaya. GSA Fall Meeting, #85-12.

Dygert, N., Bernard, R., Behr, W., 2017. Great Basin mantle xenoliths record deformation associated with active lithospheric downwelling. AGU Fall Meeting, DI22A-02.

Dygert, N., Liang, Y., 2017. REE and isotopic compositions of lunar basalts demonstrate partial melting of hybridized mantle sources after cumulate overturn is required. AGU Fall Meeting, V14B-03, (**invited**).

Dygert, N., Liang, Y., Kelemen, P.B., 2017. Formation of dunite-harzburgite-lherzolite-plagioclase lherzolite sequences by multiple episodes of melt migration and melt-rock reaction. *27th Goldschmidt Conference* (**invited**).

Dygert, N., Lin, J.F., Marshall, E., Kono, Y., Gardner, J., 2017. Viscosity and structure of a late lunar magma ocean liquid: Implications for the purity of ferroan anorthosites and the partially molten layer around the core. *Lunar and Planetary Science Conference, XLVII*, #2421.

Tokle, L., Hirth, G., Raterron, P., **Dygert**, N., Liang, Y., Holyoke, C., 2017. The pressure and Mg# dependence of ilmenite and ilmenite-olivine aggregate rheology: Implications for lunar cumulate mantle overturn. *Lunar and Planetary Science Conference, XLVII*, #2070.

†Pease, E., **Dygert**, N., Catlos, E.J., Brookfield, M., 2017. New geochemical and thermochronologic constraints on the tectonic affinity, cooling history, and timing of obduction of the Spongtang ophiolite, northwest India. GSA South Central Meeting, #289437.

†Gu, J.T., **Dygert**, N., 2017. $^{3}He/^{22}Ne$ variations among ocean island, mid-ocean ridge, and backarc basalts. GSA South Central Meeting, #289252.

Dygert, N., Jackson, C.R.M., Hesse, M., Tremblay, M., Shuster, D., Gu, J., 2016. Plate tectonic cycling and whole mantle convection modulate Earth's $^{3}He/^{22}Ne$ ratio. AGU Fall Meeting, D11A-2343.

Lin, J.F., **Dygert**, N., Marshall, E., Kono, Y., Gardner, J., 2016. Viscosity and structure of a late lunar magma ocean liquid: Implications for the purity of ferroan anorthosites and the dynamics of a crystallizing magma ocean. AGU Fall Meeting, V41A-3115.

Tokle, L., Hirth, G., Raterron, P., Holyoke, C., **Dygert**, N., 2016. The role of ilmenite content on the rheology of olivine aggregates. AGU Fall Meeting, MR23A-2673.

Li, H., Zhang, N., **Dygert**, N., 2016. Revisit the lunar overturn model with ilmenite rheology experiment results. AGU Fall Meeting, DI33A-08.

Dygert, N., Kelemen, P., Liang, Y., 2015. A gradient in cooling rate beneath the Moho at the Oman ophiolite: Fresh insights into cooling processes beneath mid-ocean ridges from REE thermometry. AGU Fall Meeting, V11E-02 (**invited**).

Tokle, L., **Dygert**, N., Liang, Y., Hirth, G., 2015. Rheology of ilmenite-bearing dunite: A weak phase in a strong matrix. AGU Fall Meeting, MR21C-2627.

Liang, Y., Sun, C., Yao, L., **Dygert**, N., Wang, C., 2015. Some remarks on the interpretation of the REE-in-two-mineral thermobarometers. AGU Fall Meeting, V13A-3093.

Dygert, N., Jackson, C.R.M., Hesse, M., 2015. The role of plate tectonic cycling in modulating Earth's $^{3}He/^{22}Ne$ ratio. *25th Goldschmidt Conference*, #2628.

Dygert, N., Hirth, G., Liang, Y., 2015. Rheology of ilmenite and ilmenite-olivine aggregates: Implications for lunar cumulate mantle overturn. *Lunar and Planetary Science Conference, XLVI*, #2058.

Dygert, N. and Liang, Y., 2014. A possible difference in cooling rates recorded in REE in coexisting pyroxenes in peridotites from ophiolites and mid-ocean ridges. *Sixth International Lherzolite Conference, Marrakech*.

Dygert, N. and Liang, Y., 2014. Decoupling among trace elements and Ni during melt migration and melt-rock reaction in the mantle: An example from a dunite-harzburgite-lherzolite sequence from Trinity Ophiolite. *Sixth International Lherzolite Conference, Marrakech*.

Dygert, N., Liang, Y., Kelley, K., 2013. A possible difference in cooling rates recorded in REE in coexisting pyroxenes in peridotites from supra-subduction ophiolites and mid-ocean ridges. AGU Fall Meeting, T11A-2412.

Liang, Y., Wang, C., Saper, L., **Dygert**, N., Xu, W., 2013. Melt-rock reaction in the asthenospheric mantle: Perspectives from laboratory dissolution experiments. AGU Fall Meeting, V23D-03.

Dygert, N., Liang, Y., Hess P., 2013. An experimental study of REE and other trace element partitioning between augite and Fe-rich basalts: A parameterized model for planetary applications. *Lunar and Planetary Science Conference, XLIV*, #1582.

Dygert, N., Meyers, C., Hirth, G., Liang, Y., 2013. Weakness of ilmenite revealed by new rheological measurements with implications for lunar cumulate mantle overturn. *Lunar and Planetary Science Conference, XLIV*, #1591.

Dygert, N., Liang, Y., Hess, P., 2012. The effect of melt TiO_2 on Fe-Ti oxide-picritic basalt HFSE partitioning: parameterized models, lunar applications. *Lunar and Planetary Science Conference, XLIII*, #2033.

Dygert, N., Liang, Y., Kelemen, P., 2011. Trace element abundances in pyroxenes from a dunite-harzburgite-lherzolite sequence at the Trinity ophiolite: Evidence for multiple episodes of melt migration and melt-rock reaction. AGU Fall Meeting, V31-D2557.

Dygert, N. and Liang, Y., 2011. Experimental evidence for high field strength incompatibility in titaniferous phases in equilibrium with high titanium mare basalts and picritic glass melts. *Lunar and Planetary Science Conference, XLII*, #1956.

Dygert, N. and Liang, Y., 2010. Compaction driven melt localization in dunites and associated rocks in the mantle: Field observations and numerical experiments. AGU Fall Meeting, T23A-2229.

Yao, L., **Dygert**, N., Peterson, M., Sun, C., Wetzel, D., Liang, Y., 2010. "A bundle of columns" model for trace element fractionation during melting and melt migration in a vertically upwelling, chemically and lithologically heterogeneous mantle. AGU Fall Meeting, V11A-2258.

Funding

Active to Dygert: $1,263,011 in research; $3510,061 in outreach
Awarded to date: $2,566,257 in research; $795,915 in outreach

Pending Proposals

A Cumulate Oxybarometer for the Lunar and Meteoritics Communities
NASA Planetary Science Early Career Award Program
PI Dygert

A Commitment to Serve
NASA Artemis III Participating Scientist Program
PI Dygert

Research (Active)

Selected — **Experimental Investigation of Lunar Mantle Rheology: Critical Parameters for Understanding Cumulate Mantle Overturn and the Thermochemical Evolution of The Moon**
NASA Solar System Workings Program
$853,724 (total), $341,951 to PI Dygert; Co-PIs Greg Hirth, Yan Liang (Brown).

2025 – 2027 — **Thermal Evolution of Enstatite Chondrite and Aubrite Parent Bodies: Constraints from Silicate Geothermometry**
NASA Future Investigators in NASA Earth and Space Science and Technology (FINESST) Program
$147,277 to PI Dygert; FI (Future Investigator) PhD student Emily Etheridge

2023 – 2025 — **Collaborative Research: Evolution of the Tristan-Gough-Walvis Ridge Hotspot System: Age and Composition of Expedition 391/397T Volcanic Basement**
NSF Marine Geology and Geophysics Program
$195,944 to Co-PI Dygert; Science PI Jesse Scholpp (Tennessee). With Wendy Nelson (PI), Bob Duncan, John Shervais, and others.

2023 – 2028 — **Research Activities Supporting Science and Lunar Exploration (RASSLE)**
NASA Solar System Exploration Research Virtual Institute (SSERVI) CAN-4

	$568,059 to Co-I Dygert; PI Dana Hurley (JHU-APL)
Outreach (Active)	
2023 – 2026	**University of Tennessee Space Outreach Activities in East Tennessee** NASA Space Grant Program, $339,891 + a $10,170 augmentation Institutional PI Dygert (Lead PI A. Strauss, Vanderbilt)
2023 – 2026	**Collaborative Research: Cultivating Tomorrow's Innovators through Exploring Planetary Images with Artificial Intelligence** NSF Advancing Informal STEM Learning Program, $1.7M Co-PI with Ping Wang (PI), and others.
Completed	
2020 – 2025	**Oak Ridge National Laboratory / University of Tennessee Science Alliance** $29,349.
2020 – 2025	**University of Tennessee Space Outreach Activities in East Tennessee** NASA Space Grant Program, $326,556 + $119,298 in augmentations Institutional PI Dygert (Lead PI A. Strauss, Vanderbilt)
2021 – 2025	**Collaborative Research: Magmatic and Mechanical Extension of the Challenger Deep Forearc Segment: Insights into Subduction Initiation** NSF OCE Marine Geology and Geophysics Program, $122,481 to Co-I Dygert; PI Robert Stern (UT Dallas)
2020 – 2023	**Experimental geochemistry and model constraints on lunar mantle dynamics** NASA Solar System Workings Program, $261,128 PI Dygert.
2022 – 2023	**Petrogenesis of basalt lavas from the Tristan and Gough hotspot: Insights from mineral and melt inclusion chemistry** United States Science Support Program (on contract from NSF) $17,991 to PI Dygert; Science PI PhD student J. Scholpp
2018 – 2023	**New constraints on thermal evolution, thermal structure, and magmatism on asteroids: Application of a REE-in-two pyroxene thermometer to meteorites and development of next-generation thermal models,** and a **post-COVID19 Funded Extension request** NASA SMD Post-COVID Recovery Program, $110,907 to PI Dygert; NASA Solar System Workings Program, $329,619 total; $254,734 to PI Dygert; Co-PIs Harry Y. McSween, Marc A. Hesse.
2023	**Participation of Jesse Scholpp on IODP Expedition 391** United States Science Support Program (on contract from NSF) $6,426 to PI Dygert; Science PI PhD student J. Scholpp
2017 – 2022	**Rheology of an evolving lunar mantle: New experimental constraints and generalized mantle viscosity models.** NASA Solar System Workings Program, $222,375 to Dygert Co-PI with Greg Hirth (PI), Yan Liang (Co-PI).
2021	**Geochemical Interaction between CO_2 and Caprock for Safe Carbon Sequestration** University of Tennessee Institute for a Secure & Sustainable Environment (ISSE), $45,000, Co-I with Khalid Alshibli (PI).
2015 – 2017	**Melt migration dynamics revealed by two-dimensional geochemical mapping of tabular dunites at the Bay of Islands Ophiolite, Newfoundland** Jackson School of Geosciences Distinguished Postdoctoral Fellowship, $140,000
2016	**Effective viscosity of planetary mantles: Developing predictive models from experimental observations** Jackson School of Geosciences Seed Grant, $13,750 Co-I with Whitney Behr

2014	**International Travel Grant** 6th Lherzolite Conference, Marrakech, $2,000 **Dissertation Fellowship** Brown University
2012 – 2013	**Rheology of ilmenite and ilmenite-bearing harzburgite** Rhode Island Space Grant Graduate Fellowship, ~$12,000

Honors

2025	**Visiting Scientist**, Woods Hole Oceanographic Institution
2024	**College of Arts and Sciences Convocation Research Award – Early Career**
2024	**Lifelong Learner Award**, Muse Knoxville
2024	**Adjunct Professor**, Department of Marine, Earth, and Atmospheric Sciences, North Carolina State University
2024	**A Top Cited Article 2022-2023:** Meteoritics and Planetary Science
2020	**A Most Downloaded Paper in 2019:** Journal of Geophysical Research – Solid Earth
2019	**Endowment: Lawrence and Dawn Taylor Chair in Planetary Geosciences**
2019	**Outstanding Teacher Award**, University of Tennessee Geoclub For commitment to service as an educator and mentor to both graduate and undergraduate students
2015	**Dissertation Prize**, Sigma Xi, Brown Chapter
2014	**Distinguished Postdoctoral Fellowship**, University of Texas at Austin
2012	**Rhode Island Space Grant Graduate Fellowship**
2012	**Inducted into Sigma Xi**
2007	**McNair Summer Research Fellowship**, Florida International University
2007	**B.S. awarded with High Distinction and High Honors in Research** University of Rochester
2007	**Inducted into Sigma Gamma Epsilon** (Earth Science honor society)
2003 – 2007	**Dean's List 7/8 eligible semesters** University of Rochester

Teaching Experience

University of Tennessee, Knoxville

2025	**Seminar in Meteoritics (EEPS 630)** Three credit graduate-level seminar (nine students). Overall student evaluation 4.95 / 5
2019; 2022; 2024; 2025	**Geochemical Modeling (GEOL 490/590)** Three credits. Overall student evaluation 4.85; 5.0 / 5 (2019; 2024; taught as an independent study for three students in 2022 and two students in 2025)
2017 – 2024	**Mineralogy (GEOL 310)** Four credits. Overall student evaluations 4.53; 4.70; 4.45; 4.48; 4.52; 4.35; 3.97; 4.62 / 5 (2017; 2018; 2019; 2020; 2021; 2022; 2023; 2024)
2023	**Mariana Trench Studies (GEOL 490/590)** Two credits (seven UTK students). This multi-institutional, multinational seminar-lecture prepared the research team for an upcoming cruise to sample the Challenger Deep forearc and provided a foundational background for students interested in marine geology. Overall student evaluation 4.91 / 5
2023	**Kinetics (GEOL 630)** Three credit graduate seminar. Spring 2023, enrollment (seven) precluded release of course evaluation data.
2018 – 2021	**Scientific Presentations (GEOL 596)** One credit. Overall student evaluations 4.46; 4.19; 4.43; 4.36 / 5 (2018; 2019; 2020; 2021)

2021	**New Views of the Moon (GEOL 630)** Three credit graduate-level seminar (13 students). Overall student evaluation 4.78 / 5
2020	**Exploring the Planets (GEOL 104)** Four credit introductory course (106 students). Overall student evaluation 3.80 / 5

Pedagogical and Professional Training

2025	Planning for What's Next Career Advancement Workshop
2024	University of Tennessee Safe Zone Training (Tier 2)
2022	Vols ACT (Active Bystander) Training
2018; 2021	University of Tennessee Strategies and Tactics for Recruiting to Improve Diversity and Excellence (STRIDE) Training
2021	University of Tennessee Safe Zone Training (Tier 1)
2019	SERC Career Development Workshop for Early Career Geoscience Faculty
2019	University of Tennessee Initiative for the Future Faculty Mentoring Program
2017	University of Tennessee New Faculty Teaching Institute
2016	SERC Preparing for an Academic Career in the Geosciences Workshop
2014	Sheridan Center for Teaching and Learning, Brown University Certificate I, Reflective Teaching

Invited Seminars

2026	Virginia Tech (department seminar)
2025	Brown University (department seminar) CASA Moon NASA SSERVI Group (planetary sample science seminar) University of New Mexico (department seminar)
2024	University of Tokyo, Japan (geochemistry group seminar)
2022	Michigan State University (department seminar) Pennsylvania State University (department seminar) University of Mississippi (department seminar)
2021	South Dakota School of Mines and Technology (department seminar)
2020	Purdue University (department seminar) Fermilab (lab colloquium, canceled because of COVID-19) University of Chicago (department seminar)
2018	Case Western Reserve University (department seminar) University of Georgia (department seminar) Centre National de la Recherche Scientifique, Toulouse, France (Solid Earth group seminar)
2017	University of Tennessee, Knoxville (department seminar) Western Carolina University (department seminar)
2016	NASA, Johnson Space Center (astromaterials seminar) Southern Methodist University (department seminar)
2015	Institute for Geophysics, UT Austin (department seminar) Jackson School of Geosciences, UT Austin (department seminar) Rice University (department seminar) University of Texas at Arlington (department seminar)
2014	Geophysical Laboratory, Carnegie Institution of Washington
2013	Woods Hole Oceanographic Institution (marine geology group seminar) Massachusetts Institute of Technology (planetary group seminar)

Conference Talks

2025	NASA Exploration Science Forum, Albuquerque 19th International Symposium on Experimental Mineralogy, Petrology and Geochemistry, Orleans France

	56th Lunar and Planetary Science Conference (two talks)
2024	55th Lunar and Planetary Science Conference
2023	GSA Fall Meeting, Pittsburgh (**invited**)
	Goldschmidt Conference, Lyon (**invited**)
2021	AGU Fall Meeting, New Orleans
	52nd Lunar and Planetary Science Conference
2019	AGU Fall Meeting, San Francisco
	50th Lunar and Planetary Science Conference
2018	AGU Fall Meeting, Washington DC (**invited**)
	67th GSA Southeast Section Meeting, Knoxville
	49th Lunar and Planetary Science Conference
2017	AGU Fall Meeting, New Orleans (two talks; one **invited**)
	Goldschmidt Conference, Paris (**invited**)
	48th Lunar and Planetary Science Conference
2015	AGU Fall Meeting, San Francisco (**invited**)
	Goldschmidt Conference, Prague
	46th Lunar and Planetary Science Conference
2014	6th International Lherzolite Conference, Marrakech
2013	44th Lunar and Planetary Science Conference
2011	42rd Lunar and Planetary Science Conference

Field Experience

2024	**Shipboard Co-Investigator for NSF-funded project, Collaborative Research: Magmatic and Mechanical Extension of the Challenger Deep Forearc Segment: Insights into Subduction Initiation** This expedition sampled mantle and crustal rocks from the Challenger Deep (Mariana Trench) forearc by robotic submersible to observe thermal and geochemical signatures of subduction initiation. Three UT graduate students under Dygert's supervision participated.
2017 – 2024	**Mineralogy field trips in East Tennessee, western North Carolina, and Virginia** Led day-long field trips to Ducktown copper basin, Corundum Knob ultramafic body, Norris Lake kimberlite, Lost Creek barite mine, and Mt. Rogers for groups of five to 30 students.
2022	**Rio Grande Rift and Jemez Lineament xenolith sampling, New Mexico** Planned and led a week-long mantle and crustal xenolith sampling trip with three graduate students, collecting in a south-north traverse (Kilbourne Hole to the Cerro de Guadalupe Puerco Neck). Xenoliths will be used as experimental starting materials and for thesis projects.
2018	**Oman Drilling Project core description, igneous team, Japan** Described primary drill core mineralogy and thin sections, calculated mineral modes, presented findings and coauthored igneous team report.
2018	**Oman Drilling Project coring operation, active serpentinization hole, Oman** Described, scanned and processed serpentinized peridotite drill core.
2016	**Lunar Crater volcanic field, central Nevada** Planned, organized and led a successful sampling campaign
2016	**Bay of Islands ophiolite, Newfoundland.** Participated in a semester-long tectonics seminar culminating in a two-week field trip led by John Dewey and Jack Casey.
2015	**Bohemian massif, Czech Republic** Sampled peridotite and eclogite xenoliths in Cenozoic alkaline volcanics .
2014	**Beni Bousera peridotite, Morocco** Sampled massif peridotites in a traverse across the margin of the body.

2011	**CRUML anorthosite belt, Charlevoix impact crater, Quebec** Planned, organized and led a week-long field trip with ~15 participants.
2009	**Trinity and Josephine ophiolites, California** Located and sampled shear zones and pyroxenites.
2006	**Jayu Khota Crater, Oruro Department, Bolivian Altiplano** Independently planned and conducted successful field campaign.
2005	**Bolivian Altiplano and Yungas** Served as field assistant to Prof. Carmala Garzione sampling surface waters, paleosols and fossils.

Beamtime Awards at National Laboratories

Completed

2021	**GUP-74737**: Beamline 16BM-B, Advanced Photon Source. Award: 6 shifts
2020	**GUP-69721**: Beamline 16BM-B, Advanced Photon Source. Award: 9 shifts
2019	**GUP-65862**: Beamline 16BM-B, Advanced Photon Source. Award: 15 shifts
2018	**GUP-59593**: Beamline 16BM-B, Advanced Photon Source. Award: 15 shifts
2018	**GUP-56580**: Beamline 16BM-B, Advanced Photon Source. Award: 12 shifts
2016	**GUP-46492**: Beamline 16BM-B, Advanced Photon Source. Award: 12 shifts

Professional and Industry Experience

2008 – 2009	**Environmental Scientist**, Apex Companies
2008	**Field Geologist**, McPhail Associates Geotechnical Consultants
2007	**IAESTE Intern**, Manipal Institute of Technology, Karnataka, India
	McNair Fellow, Florida Center for Analytical Electron Microscopy

Service

Recent Manuscript Reviews

2026	Nature Geoscience
2025	Advances in Geochemistry and Cosmochemistry
	Contributions to Mineralogy and Petrology
	Communications Earth and Environment (×2)
	Elements
	Science
	Geochimica et Cosmochimica Acta
	Geochemistry, Geophysics, Geosystems
	Journal of Geophysical Research – Planets
2024	Science
	Meteoritics and Planetary Science
	Geochimica et Cosmochimica Acta
	Chemical Geology
	Nature Communications
	Mineralogy and Petrology (×2)
	Contributions to Mineralogy and Petrology
	Earth and Planetary Science Letters (×3)
	Lithos
2023	Contributions to Mineralogy and Petrology
	Chemical Geology
	Geology
	Geochimica et Cosmochimica Acta (×2)
	Nature Geoscience
2022	Lithos

	Icarus
	Science Advances (×2)
	Contributions to Mineralogy and Petrology
	Geochimica et Cosmochimica Acta (×2)
2021	Science Advances
	Journal of Geophysical Research – Solid Earth (×2)
	Geochimica et Cosmochimica Acta
	Geochemistry Geophysics Geosystems (×3)
2020	Journal of Petrology
	Journal of Geophysical Research – Solid Earth
	Physics and Chemistry of Minerals
	Journal of Geophysical Research – Planets (×2)
	Geochemistry Geophysics Geosystems (×2)
	Elements Magazine

Professional Service

2024 – Present	**Associate Editor**, Geochimica et Cosmochimica Acta
2025	**Session Chair**, NASA Exploration Science Forum
2025	**Ad-hoc review**, NASA ROSES Program
2025	**Ad-hoc review**, NSF EAR Program
2017; 2019; 2021; 2024; 2025	**Session Chair**, Lunar and Planetary Science Conference
2015; 2019; 2024	**Judge**, Dwornik Award, Lunar and Planetary Science Conference
2023	**Ad-hoc review**, NSF OCE Program
2023	**Panelist**, NASA ROSES Program (×3)
2022	**Panelist**, NASA ROSES Program
2016 – 2024	**External reviewer**, NASA ROSES Program (×9)
2021	**Panelist**, NSF OCE Program
2017; 2019; 2021	**Judge**, AGU Outstanding Student Presentation Award
2021	**Session Convener**, Goldschmidt Conference, Lyon, France *Chemical geodynamics throughout the Solar System — Combining insights from observations, experiments, analogues, and models*
2020	**Panelist**, NASA ROSES Program
2020	**Reviewer**, Internal Proposal at an EU Institution
2019	**Primary Session Convener**, AGU Fall Meeting *Rates and Timescales of Magmatic and Dynamic Processes: Insights from Thermobarometry and Geospeedometry*
2019	**Ad-hoc reviewer**, NSF OCE Program (×2)
2018	**Secretary**, Geoconclave organizing committee
2018	**Panelist**, NASA ROSES Program
2018	**Lead Organizer**, Geoconclave Jamboree
2017	**Lunar and Planetary Science Conference Program Committee**
2015 – 2017	**Coordinator**, AGU Outstanding Student Paper Award, VGP Section
2015	**Primary Session Convener**, AGU Fall Meeting *Peridotite Records of Mantle Dynamics*

Current Service at the University of Tennessee

2025 – Present	**Interim Director, ICP-MS Core Facility**
2024 – Present	**College of Arts and Sciences Curriculum Committee**
2021 – Present	**Graduate Admissions and Program Committee Member**
2019 – Present	**PI and Director**, University of Tennessee NASA Space Grant Consortium
2017 – Present	**Supervisor**, X-ray Diffractometer

Past Service at the University of Tennessee

2025	**Peer Teaching Evaluation** (Committee chair)
2024 – 2025	**Member of Search Committee** for faculty in Critical Minerals
2025	**Panelist, College of Arts and Sciences Workshop on the Pursuit of External Funding**
2022 – 2024	**Saw Lab Czar**
2023 – 2024	**Chair of Search Committee** for Structural Geologist
2023	**Member of Search Committee** for Structure Lecturer
2022 – 2023	**Member of Search Committee** for Isotope Lab Manager
2021	**Developed New Planetary Geoscience Concentration**
2021 – 2022	**Member of Search Committee** for Isotope Geochemist
2021	**Member of Search Committee** for Department Head
2021	**Attained Vol Core Engaged Inquiries Designation** for Mineralogy
2020 – 2022	**Undergraduate Advisor**, Geology Concentration
2019 – 2021	**Undergraduate Program Committee Member**
2019 – 2024	**Student Success (Discretionary Fund) Committee Member**
2019	**Member of Search Committee** for Isotope Geochemist
2019	**Judge**, EURēCA Undergraduate Research Symposium
2019	**Department Faculty Representative**, Geoconclave Jamboree
2017 – 2019	**Tennessee Space Grant Consortium Advisory Committee Member**
2017 – 2019	**Strong Hall Space Committee Member**
2018	**Member of Search Committee** for Teaching Assistant Coordinator

Past Departmental Service at the Jackson School of Geosciences

2017	**Electron Microprobe Manager** (interim)
2016; 2017	**Judge**, Jackson School of Geosciences Research Symposium
2016	**Geoscience Leadership Organization for Women (GLOW) Scholarship Committee**
2015 – 2016	**Invited and hosted** three visiting seminar speakers

Past Departmental Service at Brown University

2010 – 2012	**Electron Microprobe Manager** (interim)
2011	**Leader and Organizer** of graduate student field trip (Quebec)
2011	**Organizer** of the geochemistry seminar

Social Media — Dygert maintains professionally-focused social media profiles on X (@NickDygert) and ResearchGate (https://www.researchgate.net/profile/Nick-Dygert).

Professional Affiliations

American Geophysical Union
Geochemical Society
Mineralogical Society of America
Geological Society of America
National Association of Geoscience Teachers

Advising, Mentoring, and Professional Supervision

Graduated

2025	**Jesse Scholpp** (PhD) Dissertation: Chemical and physical impacts of magma ocean solidification: Insights into lunar magma ocean solidification, mantle formation, and mantle evolution → Postdoc, University of Nevada Reno
2024	**Jena Samano** (MS, co-advised with Molly McCanta)

	Petrologic and geothermal profile of the lithosphere beneath Kilbourne Hole based on geochemical analysis of a mantle and crustal xenolith
2023	**Dian Ji** (MS) Thesis: Numerical and experimental constraints on trace element fractionation during lunar magma ocean solidification → PhD Program, Rice University
2023	**Megan Mouser** (PhD, transitioned from MS track in June 2019) Dissertation: Experimental approaches to evaluating silicate melt properties and trace element fractionation during crystallization at high pressures and high temperatures → Postdoc, Earth and Planets Laboratory, Carnegie Institution for Science; → Research Scientist, NASA Johnson Space Center
2022	**Nadine Grambling** (PhD) Dissertation: Natural, Experimental, and Educational Explorations of the Interiors of Terrestrial Planetary Bodies → Postdoc, Mantle Processes Group, University of Delaware
2020	**Megan Mouser**, MS (Concurrent) Thesis: Experimental investigation of Mercury's magma ocean viscosity: Implications for the formation of Mercury's cumulate mantle, its subsequent dynamic evolution, and crustal petrogenesis

Current Graduate Advisees

2024 – Present	**Anah Bogdan** (PhD track)
2024 – Present	**George Denny** (PhD track)
2023 – Present	**Emily Etheridge** (PhD track), Development and application of geothermometric methods to investigate the thermal histories of terrestrial and planetary bodies

Postdocs

2021	**Brendan Anzures**, Thermal-chemical-fO_2 evolution of the Winonaite and IAB iron meteorite parent body → Postdoc and then Research Scientist, NASA Johnson Space Center
2018 – 2021	**Michael P. Lucas**, Thermal histories of H, L, LL, and acapulcoite-lodranite parent asteroids: evidence for collisional fragmentation-reassembly → Postdoc, University of Notre Dame → Research Scientist, Florida Space Institute

Professional Staff

2025 – Present	**Brian Duggan**, PhD, LA-ICP-MS Lab Manager
2019 – 2025	**Robert Jacobsen**, PhD, Assistant Director, University of Tennessee Space Grant

Undergraduate Research Advisees at the University of Tennessee

Current

2025 – Present	**Katarina Hill**, Oxygen fugacity of lower crustal xenoliths from the Jemez Lineament

Completed

2024 – 2025	**Sabrina Sanders**, Oxygen fugacity of plagioclase-hosted melt inclusions from Walvis Ridge hotspot, with Jesse Scholpp → Laboratory Assistant, Oak Ridge National Lab
2023 – 2025	**Rachel Huk**, Mineralogy of preserved dinosaurian skin from an *Edmontosaurus* mummy, with Stephanie Drumheller-Horton, and geochemistry of the lithosphere along the Jemez lineament, New Mexico → Laboratory Assistant, Oak Ridge National Lab
Summer 2024	**Chris O'Connell**, Thermal histories of lunar anorthosites (visiting from Colgate)

2022 – 2024	**Jordan Marshall**, Phase equilibria in a Mercurian system → PhD program in Materials Engineering at the University of Tennessee
2023	**Olivia Wilkerson**, Petrogenesis of basalts from the Walvis Ridge hotspot
Summer 2022	**Máté Garai**, Thermal history of asteroid Vesta (Máté was a visiting Physics major from Sewanee) → Rhodes Scholar Finalist; PhD program in Physics at CU Boulder
2021 – 2022	**Noah Hooper**, Effective metal flotation on magma oceans → Graduate School, Brown University (PhD track)
2018 – 2021	**Beau Boring**, Dynamic evolution of lithosphere beneath Ross Island, Antarctica, Major element chemistry of peridotites from the Oman ophiolite, and Experimental Petrology → Graduate School, Brown University (PhD track)
2019 – 2021	**Taryn Hicks**, Thermal history and trace element geochemistry of mantle xenoliths from the southwest US → Graduate School, Auburn University (MS track)
2019 – 2020	**Kenley Prescher**, Trace element partitioning in Mercurian systems
2018 – 2019	**Joseph Nuttall**, Thermal and deformation history of mantle xenoliths from the southwest US → Geospatial Analyst, Wiser Consultants
Summer 2018	**Warren Eherenfried**, Thermal and deformation history of Siberian mantle xenoliths → GIS Consultant, Atmos Energy
Summer 2018	**Christopher Wilson**, Petrography and mineralogy of impactites from the Flynn Creek structure, Middle Tennessee → Environmental Scientist, Dallas Texas

Undergraduate Research Advisees at the University of Texas

Summer 2017	**Riley Winebarger**, High temperature low pressure piston cylinder experiments → Graduate School, Colorado School of Mines (MS track)
2016 – 2017	**Emily Pease**, Tectonic history of the Spongtang ophiolite → Graduate School, University of Texas at Austin (MS track)
2016 – 2017	**Jesse Gu**, $^{3}He/^{22}Ne$ systematics of oceanic basalts → Graduate School, Harvard (PhD track)

Undergraduate Research Advisee at Brown University

Summer 2013	**Reed Mershon**, Analytical methods in geochemistry, field geology, experimental petrology, rock deformation → Graduate School, University of Hawaii (PhD track)

Thesis Committees (active)

2025 – Present	**Liliana Binetti**, University of Tennessee, MS advisor Chelsea Mackaman-Lofland
2024 – Present	**Ben Alexander**, University of Tennessee, MS advisor Shichun Huang
2023 – Present	**Micki Recchuiti**, Department of Marine, Earth and Atmospheric Sciences, North Carolina State University, PhD advisor Arianna Soldati

Thesis Committees (completed)

2025	**Mohammed Elnur**, University of Tennessee, PhD advisor Khalid AlShibli (Civil Engineering)
2025	**Kaitlyn Gauvey**, University of Tennessee, PhD advisor Linda Kah
2025	**Justin Hardin**, University of Tennessee, MS advisor Shichun Huang
2024	**Jialong Ren**, University of Texas at Austin, PhD advisor Marc A. Hesse
2024	**Clarissa (CJ) Leight**, University of Tennessee, PhD advisor Molly McCanta
2023	**Cole Nypaver**, University of Tennessee, PhD advisor Bradley Thomson
2022	**Julie Coulombe**, University of Tennessee, MS advisor Molly McCanta

2022	**Carsen Adams**, University of Tennessee, MS advisor Micah Jessup
2022	**Tyler Grambling**, University of Tennessee, Knoxville, PhD advisor Micah Jessup
2022	**Micki Recchuiti**, University of Tennessee, MS advisor Molly McCanta
2021	**Corey Flynn**, University of Tennessee, MS advisor Micah Jessup
2021	**Robert Reid**, University of Tennessee, MS advisor Molly McCanta
2021	**Ammar Elhassan**, University of Tennessee, PhD advisor Z. John Ma (Civil Engineering)
2021	**Fiona Clark**, University of Cape Town, South Africa, MS advisor Phil Janney
2020	**Lucas McClure**, University of Tennessee, BS Honors thesis, advisor Sean Lindsay (Physics)
2020	**Hannah Teffeteller**, University of Tennessee, MS advisor Molly McCanta
2019	**Sarah Roberts**, University of Tennessee, PhD advisor Molly McCanta
2019	**Jennifer Harding**, Institute for Geophysics, University of Texas at Austin, PhD advisors Harm van Avendonk and Nick Hayman
2018	**Rachel Bernard**, University of Texas at Austin, PhD advisor Whitney Behr
2018	**Mathieu Rospabé**, Université Paul Sabatier, Toulouse France, PhD advisors Georges Culeneer and Patrick Pinet

Senior Design Projects

2020 – 2021	**Kah Choong, Kate Eikel, Cole Frantz, Noah Sloan**, Materials Science and Engineering, University of Tennessee. Co-supervised with Chris Wetteland, Kurt Sickafus. Design of a High-Temperature Vacuum Furnace for Replication of Chondrite Formation Conditions in Space

Community Outreach

Materials Assessment for Community Members

2025	14 evaluations
2024	14 evaluations
2023	14 evaluations
2022	11 evaluations
2021	10 evaluations
2020	13 evaluations
2019	8 evaluations
2018	6 evaluations
2017	2 evaluations

Outreach Events

2025	Wartburg Central Elementary School STEM Night
2023	Knoxville Montessori School
2021	University of Tennessee Science Forum
2019	Knoxville Gem and Mineral Society
2018	Oak Ridge Isochronous Observation Network
2017	U. Texas Planetary Organization for Space Science and Exploration

Media Releases

2025	**Deep Dive into Research** https://artsci.utk.edu/deep-dive-into-research
2021	**Moon's largest crater holds clues about early lunar mantle** https://eos.org/research-spotlights/moons-largest-crater-holds-clues-about-early-lunar-mantle
2020	**Chaotic early Solar System collisions resembled 'Asteroids' arcade game**

	https://www.jsg.utexas.edu/news/2020/12/chaotic-early-solar-system-collisions-resembled-asteroids-arcade-game/
2019	**Scientists find iron snow in Earth's core** https://www.jsg.utexas.edu/news/2019/12/scientists-find-iron-snow-in-earths-core/
2018	**Plate tectonics may have been active on Earth since the very beginning** https://www.eurekalert.org/pub_releases/2018-09/uota-ptm092618.php
2017	**Water in Earth's crust** https://www.jsg.utexas.edu/news/2017/11/water-in-the-earths-crust/
2017	**Moon's crust underwent resurfacing after forming from magma ocean** https://www.jsg.utexas.edu/news/2017/11/moons-crust-underwent-resurfacing-after-forming-from-magma-ocean/