Nicole G. Lunning

Curriculum Vitae

Education

Ph.D. Geology, University of Tennessee, Knoxville, GPA 4.0, August 2015. Dissertation Title: Insights into planetesimal evolution: Petrological investigations of regolithic howardites and carbonaceous chondrite impact melts. Advisor: H. Y. McSween, Jr.

M.S. Geology**,** University of California, Davis, GPA 3.78, June 2009. Thesis Title: Wind erosion in the Sacramento-San Joaquin Delta recorded by phytolith concentrations. Advisor: K. L. Verosub.

B.S. Geophysical Sciences**,** University of Chicago, GPA 3.45, June 2005. Honors in the College and Honors in the Geophysical Sciences, Deans' List 2002-2005.

Awards

- University of Tennessee Chancellor's Citation for Professional Promise (2015)
- Wiley-Blackwell Award for an Outstanding Student Presentation (2014)
- Best Professional Presentation from the East Tennessee Geological Society (2014)
- McKay Award for Best Student Oral Presentation at the Meteoritical Society Meeting (2013)
- Excellence in Geology Award from the Knoxville Gem and Mineral Society (2013)
- Smithsonian National Museum of Natural History Peer Recognition Award (2011)

Grants and Fellowships

- Workshop on Catastrophic Disruption in the Solar System Travel Grant (2018)
- Peter Buck Smithsonian Institution Postdoctoral Fellowship (2015-2017)
- Meteoritical Society Early Career Scientist Travel Grant (2017)
- University of Tennessee Chancellor's Fellowship (2012-2015)
- Meteoritical Society Student Travel Grants (2013, 2014, and 2015)
- University of Tennessee Graduate Student Senate Travel Grants (2013 and two in 2014)
- University of California Davis Durrell Grant for Graduate Research (2006-2007)
- University of Chicago Richter Grant for Undergraduate Research (2004-2005)

Experience

Lead OSIRIS-REx Curator (Plan-Series-Grade: GS-1330-13), Astromaterials Research and Exploration Science (ARES), NASA Johnson Space Center, March 2023-Present

- Led curation team activities toward development of procedures for spacecraft disassembly, processing, and preliminary examination of a returned asteroid sample
- Development of collection conservation long-term planning documents
- Coordinated contamination control and knowledge activities to prevent sample contamination
- Coordinated development of curation database for returned samples
- Managed curation interface with mission science team, including development of curation compliant science equipment that will be used in the cleanroom during preliminary examination
- Contributed to the OSIRIS-REx curation plan, including leading the writing and editing of the plan during the last year before the plan was finalized in January 2022

- Coordinated database documentation of contamination knowledge samples
- Managed and conducted monitoring of the OSIRIS-REx curation clean lab

Deputy OSIRIS-REx Curator (Plan-Series-Grade: GS-1330-13), Astromaterials Research and Exploration Science (ARES), NASA Johnson Space Center, March 2020-March 2023

- Managed curation interface with mission science team, including development of curation compliant science equipment that will be used in the cleanroom during preliminary examination
- Coordinated contamination control and knowledge activities to prevent sample contamination
- Co-lead curation team activities toward development of procedures for spacecraft disassembly, processing, and preliminary examination of a returned asteroid sample
- Contributed to the OSIRIS-REx curation plan, including leading the writing and editing of the plan during the last year before the plan was finalized in January 2022
- Coordinated database documentation of contamination knowledge samples
- Managed and conducted monitoring of the OSIRIS-REx curation clean lab
- Lead NASA proposal review panels as a group chief
- Attended Antarctic meteorite allocation panels to learn how to organize similar astromaterial allocation panels for the OSIRIS-REx collection
- Worked on the loan agreement for the OSIRIS-REx collection

Postdoctoral Researcher, Department of Earth and Planetary Sciences, Rutgers University, September 2018-March 2020

- Studied the petrology and geochemistry of lunar meteorite breccias, Rumuruti chondrites, and iron meteorites
- Instructor for Planet Mars, a planetary geology course for non-majors

Peter Buck Postdoctoral Fellow, National Museum of Natural History, Smithsonian Institution, September 2015-September 2018

- Classified and characterized meteorites from Antarctica and Northwest Africa
- Performed melting experiments using a 1-bar gas mixing furnace, a vertical furnace with a molybdenum-alloy pressure vessel at high temperatures and moderate pressures (e.g., 1100 ℃ and 500 bars), and a horizontal cold seal furnace at moderate temperatures and pressures (e.g., 700 ℃ and 400 bars)
- Analyzed experimental charges and meteorites with scanning electron microscope and electron microprobes (JEOL 8900, JEOL 8530F at the Smithsonian Institution)
- Outreach including meteorite vault tours and public programs
- Mentor to graduate and undergraduate students

Graduate Researcher, Lecturer, and Teaching Assistant, University of Tennessee, Knoxville, , August 2012-August 2015

- Researched meteorite petrology and geochemistry
- Taught, as a lecturer, introductory physical geology
- Guest lectured in mineralogy and planetary geology
- Led and designed lab activities for mineralogy, petrology, and planetary geology
- Used the following instruments: electron microprobe, secondary ion mass spectrometer, laser ablation-inductively coupled-mass spectrometer, Raman microprobe, scanning electron microprobe, petrographic microscope

Meteorite Technician/Contractor, National Museum of Natural History, Smithsonian Institution, , September 2010-August 2012

- Performed support and classification work for the Antarctic Meteorite Collection
- Assisted curators and summer interns with research projects: surveyed potential research samples, cut/subsampled meteorites, made thin sections, documented meteorite subsampling, analyzed samples with the scanning electron microscope and electron microprobe, extracted/processed data, drafted figures, replied to reviewer comments regarding figures, and other support activities
- Evaluated and responded to potential meteorites from members of the public

Volunteer Math Teacher, Academy of Hope in Washington, D.C., , January 2011-July 2012

- Taught basic arithmetic to adults preparing to take the GED

Community, Professional, and NASA Service

- U.S. Antarctic Search for Meteorites Field Team Member (2019-2020 season)
- Reviewer for *Geochimica et Cosmochimica Acta*, *Journal of Geophysical Research-Planets, Meteoritics & Planetary Science*, *Nature Astronomy, Polar Science, Proceedings of the National Academy of Sciences*, and *Process in Earth and Planetary Sciences*
- Served on ten NASA proposal review panels (2015-2022), two as group chief (2021-2022)
- Session chair at the Lunar and Planetary Science Conference (2018, 2021) and the Meteoritical Society Annual Meeting (2016, 2017, & 2019)
- Led tours of the Smithsonian National Meteorite Collection (2015-2018)
- Thesis Committee Member/Adjunct Faculty Member at Texas Christian University (2017-8)
- Mentor in the Geological Society of America's On To the Future (OTF) program aimed at increasing diversity in the geosciences (2015-2016)
- Organized seminar series for the UT Planetary Geosciences Institute (2014-2015)
- Astromaterials-related public outreach (2010-2022)

Peer-Reviewed Publications

McCubbin F. M., Lewis J. A., Barnes J. J., Boyce J. W., Gross J., McCanta M. C., Srinivasan P., Anzures B. A., **Lunning N. G.,** Elardo S. M., Keller L. P., Prissel T. C., and Agee C. B. (in press). On the origin of fluorine-poor apatite in chondrite parent bodies. American Mineralogist DOI: https://doi.org/10.2138/am-2022-8623

Righter K., **Lunning N. G.,** Nakamura-Messenger K., Snead C. J., McQuillan J., Calaway M., Allums K., Rodriguez M., Funk R. C., Harrington R. S., Connelly W., Cowden T., Dworkin J. P., Lorentson C. C., Sandford S. A., Bierhaus E.B., Freund S. , Connolly H.C., Lauretta D.S. (2023) Curation planning and facilities for asteroid Bennu samples returned by the OSIRIS-REx mission. *Meteorites & Planetary Science.* 58: 572-590

Righter K., Schutt J., **Lunning N. G.,** Harvey R., Karner J. (2021) Identification and pairing reassessment of unequilibrated ordinary chondrites from four Antarctic dense collection areas. *Meteorites & Planetary Science.* 56:1556-1573

Lunning N. G., Bischoff A., Gross J., Patzek M., McCoy T. J., and Corrigan C. M. (2020) Insights into the formation of ancient silica-rich magmas from Rumuruti chondrite impact melts. *Meteorites & Planetary Science.* 55:130-148.

McSween H. Y., Raymond C.A., Stolper E. M., Mittlefehldt D.W., Baker M., **Lunning N.G.**, Beck A.W., Hahn T.M. (2019) Differentiation and magmatic history of Vesta: Constraints

from HED meteorites and Dawn spacecraft data. *Chemie der Erde — Geochemistry.* 79:125526.

Lunning N. G., McCoy T. J., Schrader D. L., Nagashima K., Corrigan C. M., Gross J., and Kracher, A. (2019) Lewis Cliff 86211 and 86498: Metal-sulfide liquid segregates from a carbonaceous chondrite impact melt. *Geochimica et Cosmochimica Acta* 259: 253-269.

Crossley S. D., **Lunning N. G.,** Mayne R. G., McCoy T. J., Yang S., Humayun M., Ash R. D., Sunshine J. M., Greenwood R. C., and Franchi I. A. (2018) Experimental insights into Stannern-trend eucrite petrogenesis. *Meteorites & Planetary Science* 53: 2212-2137.

Hahn T. M., **Lunning N. G.,** McSween H. Y., Bodnar R. J., and Taylor L. A. (2018) Mg-rich harzburgites from Vesta: Mantle residua or cumulates from planetary differentiation? *Meteorites & Planetary Science* 53: 514-546

Lunning N. G., Gardner-Vandy K. G., Sosa E. S., McCoy T. J., Bullock E. S., and Corrigan C. M. (2017) Partial melting of oxidized planetesimals: An experimental study to test the formation of oligoclase-rich achondrites Graves Nunataks 06128 and 06129. *Geochimica et Cosmochimica Acta* 214: 73-85.

Hahn T. M., **Lunning N. G.,** McSween H. Y., Bodnar R. J., and Taylor L. A. (2017) Dacite formation on Vesta: Partial melting of the eucritic crust. *Meteorites & Planetary Science*. 52:1173-1196.

Lunning N. G., Corrigan C. M., McSween H. Y., Tenner T. J., Kita N. T., and Bodnar R. J. (2016) CV and CM chondrite impact melts. *Geochimica et Cosmochimica Acta* 189: 338-358.

Lunning N. G., Welten K. C., McSween H. Y., Caffee M. W., and Beck A. W. (2016) Regolithic howardites found in the Grosvenor Mountains, Antarctica. *Meteorites & Planetary Science* 51: 167-194.

Lunning N. G., McSween H. Y., Tenner T. J., Kita N. T., and Bodnar R. J. (2015) Olivine and pyroxene from the mantle of asteroid 4 Vesta. *Earth and Planetary Science Letters* 418: 126-135.

Udry A., **Lunning N. G.,** McSween H. Y., and Bodnar, R. J. (2014) Petrogenesis of a vitrophyre in the martian meteorite breccia NWA 7034. *Geochimica et Cosmochimica Acta* 141: 281-293.

Select Recent Conference Presentations

Queener M. G. (undergraduate mentee), **Lunning N. G.,** Fries M. D., Jakubek R. S., and Peslier A. H. (2023) Potential Discovery of Amphibole in Miller Range 090292 via Raman Spectroscopy. 54th LPSC #1805.

Lunning N. G., Righter K. (2022) Nomenclature for the OSIRIS-REx Returned Sample Collection to be Curated at NASA Johnson Space Center. (2022) . LPI Contributions 2695: 6295.

Lunning N. G., Gross J. (2021) Impact production of silicon-bearing iron-nickel metal: A widely occurring process on the Moon? 52nd LPSC #2225

Lunning N. G., Gross J. (2019) Lunar feldspathic regolith breccia with magnesium-rich components: Northwest Africa 11303. 50th Lunar and Planetary Science Conference #2407

*Sosa E. S. (undergraduate mentee), **Lunning N. G.,** McCoy T. J., Bullock E. S., Corrigan C. M., Gardner-Vandy, K. G. (2017) Constraining the petrogenesis of the paired achondrites GRA 06128/9 through partial melting of an oxidized chondrite. 48th LPSC #2356

*Winner of the 2017 Dwornik Award for Best Undergraduate Poster Presentation