

Curriculum Vitae – KIM A. CONE

PhD Candidate • Colorado School of Mines • Geology and Geological Engineering
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RESEARCH INTERESTS

Lunar and planetary science, lunar magma ocean evolution, cosmochemistry, igneous textural analysis, and machine learning. Primary interests focus on thermodynamic and thermal models of lunar magma ocean cooling and the consequences for petrologic structure, density, and geochemical profiles.

RELEVANT EDUCATION

- Colorado School of Mines**, Golden, Colorado 2018– May 2023
PhD Geology and Geological Engineering, magna cum laude
Dissertation: Modeling lunar magma ocean cooling using phase equilibria
Advisors: Dr. Richard M. Palin and Dr. Wendy A. Bohrsen
- Colorado School of Mines**, Golden, Colorado 2018
MS Geology and Geological Engineering, magna cum laude
Thesis: Refining crystal size distributions and kinetic histories using automated scanning electron microscopy and manual methods: A hybrid approach
Advisor: Dr. Richard Wendlandt
- Northern Virginia Community College**, Annandale, Virginia 2012
AS Mathematics, summa cum laude
- George Mason University**, Fairfax, Virginia 2010
BS Geology, summa cum laude
Advisor: Dr. Richard Diecchio

RELEVANT RESEARCH EXPERIENCE

IIE-GIRE Research Fellow, University of Oxford

I collaborated with co-advisor Dr. Richard Palin and other UK researchers to develop a novel approach for lunar magma ocean cooling models using previously unexplored astronomical constraints that reflected the conditions shortly after the Moon-forming impact. The collaboration also involved the Colorado School of Mines (Dr. Wendy Bohrsen), the University of Florida (Dr. Stephen Elardo), and UC Santa Barbara (Dr. Frank Spera).

Visiting PhD Student, The Florida Planets Lab, University of Florida

I joined the Florida Planets Lab under planetary scientist Dr. Stephen Elardo for the Fall 2021 semester where I acquired hands-on practice with the piston cylinder apparatus and refined my understanding of cosmochemistry and lunar magma ocean processes. A joint publication will be submitted in early 2023—funded by a GSA Graduate Student Research Grant and an IIE-GIRE fellowship—involving the Colorado School of Mines, The University of Oxford, the University of Florida, and UC Santa Barbara.

MS Graduate Teaching Assistant, Colorado School of Mines

My MS research focused on developing a protocol for the quantitative textural analysis of basaltic lavas from the 1783-1784 Laki, Iceland eruptions. The work was uniquely complemented with element and crystal size population data of plagioclase using scanning electron microscopy. The research culminated in a novel methods-focused publication in *American Mineralogist*, 2020.

Pre-doctoral Intern, Carnegie Geophysical Laboratory

My primary work consisted of diamond-anvil cell and Raman spectroscopy analysis on the high pressure-temperature carbon speciation of paraformaldehyde. My secondary work involved collaboration on a NASA Astrobiology Institute project on prebiotic molecular selection and organization (led by Dr. Robert Hazen), conducting racemic sugar adsorption experiments on mineral surfaces.

Undergraduate Researcher, George Mason University

My work involved scanning electron microscopy imaging and petrography of Appalachian phosphatic sediments to unravel diagenesis histories, completed at James Madison and George Mason Universities.

Undergraduate Lab Assistant, George Mason University

I was a lab assistant to EPA STAR Fellowship recipient, Dr. Jeanne Hartzell, investigating the environmental effects of iron in sequestering phosphorus in the Chesapeake Bay, Virginia. I manually segmented soft-sediment cores using a nitrogen glove bag and then processed the segments using a SEDEX procedure (a multi-step process for extracting different forms of phosphorus from sediment).

TEACHING EXPERIENCE AND RELEVANT WORK

Graduate Research Assistant , Colorado School of Mines	2018–current
Graduate Teaching Assistant , Colorado School of Mines	2015–2018
Graduate Student Lecturer for Planetary Geology , Colorado School of Mines Senior undergraduate-Graduate level	Fall 2019
Guest Lecturer for Planetary Geology , Colorado School of Mines Senior undergraduate level	Fall 2018
Advanced Igneous Petrology Lab Instructor , Colorado School of Mines Graduate level	Fall 2018
Mineralogy and Petrology Lab Instructor , Colorado School of Mines Undergraduate level	2014–2017
Igneous and Metamorphic Petrology Lab Instructor , George Mason University Undergraduate level Supervisor: Dr. Julia Nord	Spring 2012
Geology Lab Manager , George Mason University Supervisor: Dr. Julia Nord	Spring 2012
Historical Geology Lab Instructor , George Mason University Undergraduate level Supervisor: Dr. Stacey Verardo	Springs 2009–2012
Physical Geology Lab Instructor , George Mason University Undergraduate level Supervisor: Dr. Stacey Verardo	Falls 2008–2012
Mineralogy Lab Instructor , George Mason University Undergraduate level Supervisor: Dr. Julia Nord	Fall 2011

Sedimentary Geology Lab Instructor, George Mason University
Undergraduate level
Supervisor: Dr. Richard Diecchio

Springs 2009–2011

Pre-doctoral Intern, Carnegie Geophysical Laboratory
Supervisor: Dr. Robert Hazen

2007–2008

Science Assistant Intern, OIA, National Science Foundation
Supervisor: Dr. Nathaniel Pitts

Summer 2004

CONFERENCE ABSTRACTS

Cone, K.A., Elardo, S.M., Palin, R.M., Spera, F.J., Bohrsen, W.A., Astudillo Manosalva, D.F. Reconciling the Lunar Primitive Upper Mantle composition with crystallization models: Why Do Lunar Magma Ocean Cooling Models Struggle to Reproduce a GRAIL-Era Crustal Thickness? GSA Annual Meeting, Denver, USA, 2022. Presentation.

Elardo, S.M., **Cone, K.A.**, Palin, R.M. Insights into the Mantle Source of the Chang'E-5 Lunar Basalts from Experiments and Modeling. Goldschmidt, Hawaii, USA, 2022. Abstract #12649. Lead-author presentation.

Cone, K.A., Elardo, S.M., Hernández-Uribe, D., Bohrsen, W.A., Astudillo Manosalva, D.F., Distel, A.G., ... Crystallization of the Lunar Magma Ocean and Consequences for a Cumulate Mantle Overturn. LPSC 53, Houston, TX. Abstract #2120 (2022). Presentation.

Elardo, S.M., **Cone, K.A.**, Palin, R.M. Insights into the Mantle Source of the Chang'E-5 Basalts from Experiments and Modelling. LPSC 53, Houston, TX. Abstract #2501 (2022). Lead-author presentation.

Cone, K.A., Palin, R.M., Singha, K. Machine Learning Approaches in Lunar Mantle Heterogeneity Investigations. AGU Fall Meeting, San Francisco, USA, 2020. Talk and poster (eLightning Session).

Cone, K.A., Palin, R.M., Singha, K. Revealing the Hidden Structure of the Lunar Interior: Insights from Machine Learning. GSA Annual Meeting, Montréal, Canada, 2020. Invited speaker.

Cone, K.A., Palin, R.M., Singha, K. Lunar Mantle Heterogeneity and the Apollo Mare Basalts: Examples from ApolloBasaltDB. GSA Annual Meeting, Phoenix, USA, 2019. Presentation.

Cone, K.A., Wendlandt, R.F., Pfaff, K., Orlandini, O. Textural Constraints and Imaging Techniques: Bias in Extracting Crystal Size Distributions. GSA Annual Meeting, Phoenix, USA, 2019. Requested presentation.

Cone, K.A., Diecchio, R.J. Geological Development of North America. GSA Annual Meeting, Phoenix, USA, 2019. Poster.

Cone, K.A., Palin, R.M. Construction of a petrological database for lunar mare basalts. 7th Annual Graduate Research and Discovery Symposium, Colorado School of Mines, Golden, USA, 2019. Poster.

Cone, K.A., Krekeler, M.P.S., Diecchio, R.J., Kearns, L.E. Investigation of phosphatic sediment diagenesis of the Reedsville Formation, W. Virginia. GSA Annual Meeting, Philadelphia, USA, 2006. Poster.

PEER-REVIEWED PUBLICATIONS AND PUBLISHED DATABASES

Cone, K., 2021. ApolloBasaltDB DB_V2, Version Version 1.0. Interdisciplinary Earth Data Alliance (IEDA). <https://doi.org/10.26022/IEDA/111982>

Hernández-Uribe, D., Palin, R.M., **Cone, K.A.**, Cao, W., 2020. Petrological implications of seafloor hydrothermal alteration on subducted mid-ocean ridge basalt. *Journal of Petrology*. <https://doi.org/10.1093/petrology/egaa086>

Cone, K.A., Palin, R.M., Singha, K., 2020. Unsupervised Machine Learning with petrological database ApolloBasaltDB reveals complexity in lunar basalt major element oxide and mineral distribution patterns. *Icarus*. <https://doi.org/10.1016/j.icarus.2020.113787>

Cone, K.A., Wendlandt, R.F., Pfaff, K., Orlandini, O., 2020. Texture constraints on crystal size distribution methodology: An application to the Laki fissure eruption. *American Mineralogist*. <https://doi.org/10.2138/am-2020-7007>

Hernández-Uribe, D., Hernández-Montenegro, J., **Cone, K.A.**, Palin, R.M., 2020. Oceanic slab-top melting during subduction: Implications for trace-element recycling and adakite petrogenesis. *Geology*. <https://doi.org/10.1130/G46835.1>

LEADERSHIP, SERVICE, AND CAREER DEVELOPMENT

Student mentee, AGU Study of Earth's Deep Interior (DI) mentorship program	2022
Reviewer for Icarus	2022
Reviewer for Earth Science, Systems and Society	2021
Judge, Undergraduate Research Symposium, Colorado School of Mines	2021
Member, Diversity Inclusion and Access Committee, Colorado School of Mines	2020–2021
Reviewer, Journal of Geophysical Research	2020–current
Co-creator and member, Graduate Student Seminar Series, Colorado School of Mines	2020–current
Participant, Out in Science, Technology, Engineering, and Mathematics SAFEZone Training	2020
Participant, American Psychological Association Convention	2020
Judge, AGU Fall Meeting Outstanding Student Presentation Awards	2020
Participant, Facilitating Remote and Online Learning, Colorado School of Mines	2020
Participant, Suicide Prevention Training	2019
Participant, Data-Driven Discovery in Earth Materials Workshop	2018
Reviewer, Geoscience Frontiers	2018
President, Geo Club, George Mason University	2008

AWARDS, HONORS, AND GRANTS

CSM GGE Tuition Fellowship	2022
GSA Graduate Student Research Grant	2022
AWG Outstanding Student Award, Laramide Chapter	2021
Zonta International Amelia Earhart Fellowship finalist	2021
IIE Graduate International Research Experience (GIRE) Fellow	2021
AGU Virtual Student Travel Grant	2020
NSF/GSA Graduate Student Geoscience Grant & On to the Future Research Grant	2020
Research Assistantship Award, Colorado School of Mines	2018–2021
Teaching Assistantship Award, Colorado School of Mines	2014–2017
Outstanding Senior in Earth Science Award, Geology, George Mason University	2010
George Mason University Foundation Scholarship	2007
Achievement Award in Geology, Northern Virginia Community College	2004
Achievement Award in Mathematics, Northern Virginia Community College	2002

CURRENT PROFESSIONAL AFFILIATIONS

Geological Society of America (GSA)

American Geophysical Union (AGU)

Mineralogical Society of America (MSA)

Association for Women Geoscientists (AWG)

International Association for Mathematical Geosciences (IAMG)

Society of Economic Geologists (SEG)