Adam Charles Curry

Department of Marine, Earth, and Atmospheric Sciences
North Carolina State University
2800 Faucette Drive, 1142B Jordan Hall,
Raleigh, North Carolina 27695
Mobile: +1 (984) 944-2603 Email: accurry3@ncsu.edu

RESEARCH INTERESTS

I am interested in the chemical, physical, and thermal evolution of magmatic systems. My research aims to integrate geochemistry, zircon geochronology, modelling, and machine learning to understand magma evolution and eruption. Particular research interests are:

- Critical minerals, the geochemical evolution of Li-rich pegmatite ore bodies, and their effects on critical zone geochemistry.
- Using supervised and unsupervised machine learning to unravel magma evolution and regional petrologic trends.
- Combining zircon geochronology and chemistry with thermal and zircon modelling of magmas.
- The influence of tectonic and petrologic factors on zircon geochronology.

CURRENT POSITION

2023- Assistant Research Professor, Department of Marine, Earth and Atmospheric Sciences, NCSU, Raleigh, NC

EDUCATION

2020 Ph.D., Earth Sciences, University of Geneva, Switzerland
Dissertation: New insights into the evolution of silicic magma bodies in the central San Juan caldera cluster, Colorado, USA
Advisor: Luca Caricchi
Committee: Urs Schaltegger, Olivier Bachmann, Axel Schmitt

2013 M.S., Geological Sciences, University of North Carolina, Chapel Hill, NC
Thesis: The role of shear heating in producing crystal-poor obsidian
Advisor: Allen Glazner

2010 B.A., Geology, Pomona College, Claremont, CA
Senior Thesis: Geochemical investigation of the Red Cinder Peak area of Makushin Volcano, Unalaska, AK
Advisor: Jade Star Lackey

RESEARCH EXPERIENCE

2021-23 Postdoctoral Research Scholar, Department of Marine, Earth and Atmospheric Sciences, NCSU, Raleigh, NC
Research focus: Geochemistry and petrogenesis of Li-rich pegmatites in the Carolina Tin-Spodumene Belt, North Carolina
Supervisor: Russell Harmon

2016-20 Research Assistant, Department of Earth Sciences, University of Geneva, Switzerland
Research focus: Petrology, geochronology, and statistical data analysis of large crustal magma reservoirs in the San Juan Mountains, Colorado.
Supervised by Luca Caricchi

2011-13 Research Assistant, Department of Geological Sciences, University of North Carolina, Chapel Hill, NC
Research focus: Petrogenesis of obsidian using geochemistry, mineralogy, and thermal modelling.
Supervised by Allen Glazner

2010 Research Assistant, Department of Earth Sciences, University of Oregon, Eugene, OR
Operated laser fluorination line in the Stable Isotope Laboratory to investigate oxygen isotopes of whole crystals.
Supervised by Ilya Bindeman

TEACHING EXPERIENCE

2023 Lead Instructor, Duke University: Solid Earth/Earth Materials (ECS201)
2023 Co-instructor, NCSU: Junior Seminar (MEA495)
2022 Teaching Assistant, NCSU: Geology Field Course (MEA465)
2018-19 Teaching Assistant, University of Geneva: Petrology I
2017-19 Teaching Assistant, University of Geneva: Physical Volcanology (with Field Course)
2016-19 Teaching Assistant, University of Geneva: Magmatic Petrology
2012-13 Teaching Assistant, UNC: Petrology and Plate Tectonics
2012 Head Teaching Assistant, UNC: Introduction to Geology
2011-12 Teaching Assistant, UNC: Introduction to Geology
2011 Graduate Research Consultant, UNC: Field Geology of Eastern California

PRIVATE-SECTOR WORK EXPERIENCE

2013-16 Professional Geologist, AECOM
(07/2015 – 05/2016) Deputy project manager, Austin, TX
(11/2013 – 06/2015) Staff geologist and field supervisor, Raleigh, NC
Environmental site assessment and remediation projects involving solvents, metals, and petroleum hydrocarbons in groundwater and soil. Developed and wrote work plans, site assessment reports, and remediation reports for clients. Supervised and managed entry-level field staff.

2010-11 Environmental Field Scientist, Professional and Technical Support Services, Baton Rouge, LA
Worked as part of a field team collecting soil and water samples and installing monitoring wells. GeoProbe machines operated as leader include 7730, 6620, and 54 TR rigs and the EC, MIP, and HPT probes.

STUDENT MENTORING

2024- Dylan Morrison (UNC-Chapel Hill M.S. student)
2023- Trevor Gunn (NCSU M.S. student)
2023- Ezra Becker (NCSU M.S. student)
2022- Russell Murray (NCSU undergraduate)
2021- Mentor in the PROmoting Geoscience Research, Education, and SuccesS (PROGRESS) NSF program (NCSU undergraduates)
2022-2023 Joshua Mistele (NCSU undergraduate)
2017-2018 Jonathan Menetrey and Pablo Anzules (University of Geneva M.S. students)
2011 GEOL 72H (honors) class, 20 students (Undergraduates, UNC-Chapel Hill)

PROFESSIONAL SERVICE

University Service:
2022- NCSU MEAS Diversity Committee
2022- NCSU MEAS Seminar Committee
2022 NCSU MEAS Symposium Organization Committee
Peer-reviewed Journal Reviewer:
Lithos (2021,2022)
Journal of Petrology (2022)
Editor:
2023- Review Editor, Frontiers in Earth Science – Geochemistry

PROFESSIONAL DEVELOPMENT

2023 Participant in Shaping the future with Researcher-run Journals Workshop at AGU
2023 Inclusive Teaching Certification at NCSU
2021-2022 Member of NCSU MEAS Unlearning Racism in GEoscience (URGE) Pod

OUTREACH ACTIVITIES

2023 Organized quarterly meeting of North Carolina Board for Licensing of Geologists (NCBLG) at NC State University, including outreach lunch for students and faculty to learn more about licensure of geologists.
2020- Conduct yearly outreach sessions with elementary school children at the International Montessori School in Durham, North Carolina, focusing on local geology, volcanoes, and mineral resources.
2017-2019 In May of each year during the field course for Physical Volcanology, I participated in an outreach event in the Massif Central, France (Borée) with local school children discussing local volcanoes and their hazards.

ORGANIZATION OF CONFERENCES AND FIELD WORKSHOPS

2019 Mount Etna and the Aeolian Islands, Sicily: Evolution and Monitoring of Europe's Most Active Volcanoes (DPMS Field Workshop)
Proposed, organized, and secured funding through the Doctoral Program in Mineral Sciences (DPMS) of the Conférence Universitaire de Suisse Occidentale for an 8-day field workshop to Italy for 15 Ph.D. students and invited local experts.

2019 Tectonics and Magmatism in Complex Settings (DPMS Workshop)
Proposed, organized, and secured funding through the Doctoral Program in Mineral Sciences (DPMS) of the Conférence Universitaire de Suisse Occidentale for a 2-day workshop for Ph.D. students led by four invited experts in petrology and tectonics.

PROFESSIONAL CERTIFICATES

- North Carolina Professional Geologist, license #2434 (current)
- Texas Professional Geoscientist, license #12213 (inactive)

TECHNICAL EXPERTISE

- Electron probe microanalyzer, scanning electron microscopy, secondary-ion mass spectrometry, laser ablation-inductively coupled plasma-mass spectrometry, x-ray fluorescence, and laser-induced breakdown spectroscopy
- Chemical abrasion-isotope dilution-thermal ionization mass spectrometry
- COMSOL Multiphysics finite-element modelling software
- Matlab, R, ArcGIS
- GeoProbe drill rigs 7730, 6620, and 54 TR, and GeoProbe direct sensing EC, MIP, and HPT probes

FIELD EXPERIENCE

2023 Maine Pegmatite Workshop
2019 Field workshop in the Aeolian Islands, Italy
2018 Field work in the San Juan Mountains, CO, for Ph.D.
2018 Field workshop in central Japan
2018 Field work at Nevado de Toluca, Mexico
2017 IAVCEI Field trip to the Southern Rocky Mountains, NM and CO
2016 Field work in the San Juan Mountains, CO, for Ph.D.
2012 Field work in Long Valley and Coso volcanic areas, CA, for M.S.
2010 International Volcanology Field School, Institute of Volcanology and Seismology, Kamchatka, Russia
2009 Field work on Unalaska Island, AK, for undergraduate senior thesis
2009 Frontiers Abroad Field Camp, Frontiers Abroad, New Zealand
2008 Field Methods in Volcanology, University of Hawaii, Hilo, HI
2008 Field Assistant for International Training Course, CSAV, Hilo, HI

GRANTS (FUNDED)

2024 Research Grant ($100,000), NC Policy Collaboratory
2023 Research Grant ($5,000), Piedmont Lithium
2022 Instrumentation Grant ($45,000), NC Policy Collaboratory
2022 Research Grant ($31,500), Piedmont Lithium
2022 Research Grant ($30,300), NC Policy Collaboratory
2022 Research Grant ($8,500), Piedmont Lithium
2018 Analytical Research Award (1,000 CHF), SwissSIMS Ion Probe National Facility, University of Lausanne, Switzerland

2012 Valentine Eastern Sierra Reserve Student Research Grant ($500), University of California
2012 Sigma Xi Grant-In-Aid-Of-Research ($400)

GRANTS (SUBMITTED)

2023 Research Grant ($100,000), NC Policy Collaboratory
2023 Research Grant ($50,000), Piedmont Lithium
2021 Postdoctoral Fellowship, Division of Earth Sciences, NSF ($180,000)
2020 Early Postdoc Mobility Fellowship, Swiss NSF (92,250 CHF)

HONORS

2013 Walter H. Wheeler Teaching Award, UNC Chapel Hill
2010 Richard E. Strehle Award, Pomona College
2010 Isabel F. Smith and Donald H. Zenger Award, Pomona College

PROFESSIONAL AFFILIATIONS

2022- Society of Economic Geologists
2022- Carolina Geological Society
2017 - European Geosciences Union
2017 - International Association of Volcanology and Chemistry of the Earth's Interior
2010 - Geological Society of America
2010 - American Geophysical Union
2010 - Sigma Xi

INVITED TALKS

2023 *Li-rich pegmatites of the Carolina Tin-Spodumene Belt,* Maine Pegmatite Workshop, Bethel, ME
2023 *Chemical and temporal evolution of crustal magmas: from super eruptions to economic Li deposits,* University of Hawai'i, Hilo, HI
2023 *Chemical and temporal evolution of crustal magmas: from super eruptions to economic Li deposits,* Florida Atlantic University, Boca Raton, FL
2022 *Petrology and geochronology of the last gasp of the central San Juan caldera cluster, Colorado,* Geological Society of America, GSA Connects 2022 Meeting, Denver, CO

PUBLICATIONS

Papers (Published, peer-reviewed journals)

Wise, M.A., **Curry, A.C.**, Harmon, R.S., 2024, Reevaluation of the K/Rb-Li Systematics in Muscovite as a Potential Exploration Tool for Identifying Li Mineralization in Granitic Pegmatites, *Minerals*, 14(1), https://doi.org/10.3390/min14010117.

Harmon, R.S., Wise, M.A., **Curry, A.**, Mistele, J.S., Mason, M.S., Grimac, Z., 2023, Rapid Analysis of Muscovites on a Lithium Pegmatite Prospect by Handheld LIBS, *Minerals*, 13 (697), doi: https://doi.org/10.3390/min13050697.

Wise, M.A., Harmon, R.S., **Curry, A.**, Jennings, M., Grimac, Z., Khashchevskaya, D., 2022, Handheld LIBS for Li Exploration: An Example from the Carolina Tin-Spodumene Belt, USA, *Minerals*, 12 (77), doi: https://doi.org/10.3390/min12010077. (*Editor's Choice Article*)

Curry, A., Caricchi, L., Lipman, P., 2021a, Magmatic evolution of zoned and unzoned ignimbrites: evidence for a complex crustal architecture feeding four rapid-sequence, caldera-forming eruptions in the San Juan Mountains, Colorado, *Journal of Petrology*, v. 62 (5), p. 1-37, doi: https://doi.org/10.1093/petrology/egab006.

Curry, A., Gaynor, S.P., Davies, J.H.F.L., Ovtcharova, M., Gaynor, G., Simpson, G., Caricchi, L., 2021b, Timescales and thermal evolution of large silicic magma reservoirs during an ignimbrite flare-up: perspectives from zircon, *Contributions to Mineralogy and Petrology*, v. 176 (12), p. 1-27, doi: https://doi.org/10.1007/s00410-021-01862-w.

Papers (submitted)

Curry, A., Wise, M.A., Harmon, R.S., Trace element mineral chemistry of Li-rich pegmatites in the Carolina Tin-Spodumene Belt, North Carolina, USA, *Economic Geology, Special Volume on Lithium (invited).*

Papers (In prep)

Curry, A., Singer, M., Musu, A., Caricchi, L., Supervised and unsupervised machine learning applied to an ignimbrite flare-up in the central San Juan caldera cluster, Colorado, *Artificial Intelligence in Geosciences (intended journal for submission), Special Issue on Data Driven Science Applied to Magmatic and Volcanic Systems.*

Curry, A., Wise, M.A., Harmon, R.S., Spodumene trace element chemistry in pegmatites versus hydrothermal veins, Colorado, *Geology (intended journal for submission).*

Curry, A., Davies, J.H.F.L., Caricchi, L., Lipman, P., Gaynor, S.P., Zircon Hf and O isotopes during a rapid ignimbrite flare-up, central San Juan caldera cluster, Colorado, *Geology (intended journal for submission).*

Chapters

Curry, A.C., 2010, Geochemical Investigation of the Red Cinder Point Area of Makushin Volcano, Unalaska, Alaska, *in* Keck Geology Consortium Proceedings of the Twenty-Third Annual Keck Research Symposium in Geology, 328-334, https://keckgeology.org/files/pdf/symvol/23rd/Unalaska/Curry.pdf.

Conference Abstracts (talks)

Curry, A.C., Wise, M.A., Harmon, R.S., 2024, Trace element mineral chemistry of Li-rich pegmatites in the Carolina Tin-Spodumene Belt, North Carolina, Geological Society of America Abstracts with Programs. Vol. 56, No. 2, doi: 10.1130/abs/2024SE-398434.

Harmon, R.S., **Curry, A.C. (speaker)**, Wise, M.A., 2024, Analysis of muscovite from the Spruce Pine Pegmatite District by laser-induced breakdown spectroscopy (LIBS), Geological Society of America Abstracts with Programs. Vol. 56, No. 2, doi: 10.1130/abs/2024SE-398437.

Curry, A.C., 2022, Petrology and geochronology of the last gasp of the central San Juan caldera cluster, Colorado, Abstract 381163, GSA Connects, Denver, Colorado, 9-12 October (*invited).*

Curry, A.C., Wise, M.A., Coleman, D.S., Harmon, R.S., Grimac, Z., 2022, Petrogenesis and classification of pegmatites in the Carolina Tin-Spodumene Belt, USA, Abstract 381197, GSA Connects, Denver, Colorado, 9-12 October.

Curry, A.C., Caricchi, L., Davies, J.H.F.L., and Ovtcharova, M., 2019, Zircon petrochronology of four rapid-succession, caldera-forming eruptions in the central San Juan caldera cluster, Abstract V44A-08, AGU Fall Meeting, San Francisco, California, 9-13 December.

Curry, A.C., Caricchi, L., Davies, J.H.F.L., and Ovtcharova, M., 2019, Zircon petrochronology of four rapid-succession, caldera-forming eruptions in the central San Juan caldera cluster, 17th Swiss Geoscience Meeting, Fribourg, Switzerland, 22-23 November.

Curry, A.C., Caricchi, L., and Lipman, P., 2017, Determining the physical and chemical processes behind four caldera-forming eruptions in rapid succession in the San Juan caldera cluster, Colorado, USA, Abstract ME42A-1, IAVCEI Scientific Assembly, Portland, Oregon, 14-18 August.

*Conference Abstracts (posters; *=student mentee)*

Lewbart, G.A., Muñoz-Pérez, J.P., Lohmann, K.J., Hirschfeld, M., Alarcon-Ruales, D., Valle, C., Páez-Rosas, D., Bolanos, J., Loyola, A., Townsend, K., Soldati, A., **Curry, A.**, Hyland, E., Cohen, E., 2024, Iguana rocks: the occurence of enteroliths in Galapagos marine iguanas (*Amblyrhynchus Cristatus*), 6th Galapagos Research and Conservation Symposium, San Cristóbal, Galapagos, 15-16 July.

Curry, A., Wise, M.A., Harmon, R.S., 2023, Geochemistry of Lithium-rich Pegmatites in the Carolina Tin-Spodumene Belt, USA, Abstract V41C-0131, AGU Fall Meeting, San Francisco, California, 11-15 December.

Murray, R.M.*, Harmon, R.S., **Curry, A.C.**, Mistele, J.S.*, Mason, M.S., Grimac, Z., Richter, D.D., 2023, Soil Analysis by Handheld Laser-induced Breakdown Spectroscopy (LIBS) for Identification of Buried Pegmatite, Abstract 389566, GSA Connects, Pittsburgh, PA, 15-18 October.

Mistele, J.S.*, **Curry, A.C.**, Harmon, R.S., Murray, R.M.*, Wise, M.A., Jennings, M., 2022, Quantitative analysis of Li, K, Rb, and Cs in rare-element pegmatite muscovite and the rapid determination of pegmatite fractionation by handheld laser-induced breakdown spectroscopy (LIBS), Abstract 379076, GSA Connects, Denver, Colorado, 9-12 October.

Curry, A.C., Caricchi, L., 2020, A data-driven approach to the petrological study of an ignimbrite flare-up in the central San Juan caldera cluster, Colorado, Abstract V003-0001, AGU Fall Meeting, San Francisco, California (virtual), 1-17 December.

Curry, A.C., Caricchi, L., and Lipman, P., 2018, Rapid, distinct magma generation preceding four caldera-forming eruptions in the Southern Rocky Mountain Volcanic Field, 16th Swiss Geoscience Meeting, Bern, Switzerland, 30 November-1 December.

Curry, A.C., Caricchi, L., and Lipman, P., 2017, Determining the physical and chemical processes behind four caldera-forming eruptions in rapid succession in the San Juan

caldera cluster, Colorado, USA, Abstract V11C-0364, AGU Fall Meeting, New Orleans, Louisiana, 11-15 December.

Curry A., Caricchi L., Sheldrake T., Simpson G. Lipman P., 2017, Determining the physical and chemical processes behind four caldera-forming eruptions in rapid succession in the San Juan caldera cluster, Colorado, USA, 15th Swiss Geoscience Meeting, Davos, Switzerland, 17-18 November.

Curry, A.C., Caricchi, L., and Lipman, P., 2017, Determining the physical processes behind four large eruptions in rapid sequence in the San Juan caldera cluster (Colorado, USA), Geophysical Research Abstracts, vol. 19, EGU2017-18630, EGU General Assembly, Vienna, Austria.

Curry, A.C., 2013, The role of shear heating in obsidian formation within volcanic conduits, Abstract V21B-2716, AGU Fall Meeting, San Francisco, California, 9-13 December.

Curry, A.C., 2013, The role of shear heating in the formation of obsidian: Geological Society of America Abstracts with Programs, v. 45, no. 6, 14-15

Nicolaysen, K.E., **Curry, A.C.**, Goldberg, A., Wobus, R.A., Lackey, J.S., Hazlett, R.W., and Bindeman, I.N., 2010, Thermobarometry, argon dating and oxygen isotope geochemistry of the Pleistocene Pt. Tebenkof ignimbrite, Makushin Volcano, AK, Abstract V11D-2334, AGU Fall Meeting, San Francisco, California, 13-17 December.