

Current appointment

Sept. 2025 **The University of Arizona**, Postdoctoral Research Associate, *LaserChron-AHIL*

Education

Fall 2020–Fall 2025 **Washington State University**, Ph.D. in Geology, *School of the Environment*

2015–2017 **Universidad Nacional de Colombia**, Master of Engineering - Mineral resources, *School of Mines*

2009–2015 **Universidad Nacional de Colombia**, Engineering Geologist, *School of Mines*

Academic Publications

Journal Paper 2025 **Bolhar, R., Hofmann, A., Whitehouse, J., Maas, R., Kamber, B.Z., Vervoort, J.D., Jeon, H., Botero, M., Bekker, A., Kabete, J. (2026). Eoarchean TTG formation via melt-solid interaction at the base of the Tanzania Craton inferred from multi-proxy detrital zircon data, EARTH AND PLANETARY SCIENCE LETTERS, 676, 119701**

Journal Paper 2025 **Botero, M., Vervoort, J.D., and Meira, V.T. (2025) Tracing primary signatures in Eo-Paleoarchean terranes: Mineral-scale constraints on disturbed bulk-rock isotope records, EARTH AND PLANETARY SCIENCE LETTERS, 671, 119668**

Journal Paper 2025 **Botero, M., Vervoort, J.D., Meira, V.T., de Sousa, D.F.M., Santos, T.J. (2025) U-Pb and Lu-Hf isotopic evolution of 3.6 Ga remnants in NE Brazil – implications on Eo-Paleoarchean global crustal evolution, CHEMICAL GEOLOGY, 678, 122646, 678, 122646**

Journal Paper 2023 **Botero, M., Vervoort, J.D., and Corfu, F. (2023) Archean to Paleoproterozoic magmatic and metamorphic evolution of the Lofoten–Vesterålen area in northern Norway through zircon U-Pb and Hf isotopic analysis, PRECAMBRIAN RESEARCH, 397, 107168**

Journal Paper 2023 **Botero, M., Vinasco, C.J., Restrepo-Moreno, S.A., Foster, D.A., Kamenovet, G.D. (2023) Caribbean–South America interactions since the Late Cretaceous: Insights from zircon U–Pb and Lu–Hf isotopic data in sedimentary sequences of the northwestern Andes, JOURNAL OF SOUTH AMERICA EARTH SCIENCES, 104231**

Journal Paper 2015 **Botero, M., Marin, S.P., and Vinasco, C.J. (2015) Shape preferred orientation studies for hand specimens and rock outcrop through digital image processing, BOLETÍN DE CIENCIAS DE LA TIERRA**

Academic Publications submitted

Under review **Botero, M., Vervoort, J. D., and Hofmann, A. Tracking Archean Crustal Growth of the Zimbabwe Craton through an integrated geochronology and isotope geochemistry approach, JOURNAL: GEOCHIMICA ET COSMOCHIMICA ACTA**

Invited department seminars

University of Arizona **Tracing primary signatures in Eo-Paleoarchean terranes: Mineral-scale constraints on disturbed bulk-rock isotope records, DEPARTMENT OF GEOSCIENCES COLLOQUIUM, Fall 2025**

University of Johannesburg **The Paleoproterozoic crustal record of the northern São Francisco craton from U-Pb, Hf, and Nd isotope systematics, DEPARTMENT OF GEOLOGY, Sept. 2023**

Peer-reviewed conference proceedings

Oral presentation 2024 **Botero, M., Vervoort, J.D., and Meira, V.T., (2024, August) Evaluating the bulk-rock Hf and Nd isotope record: implications for the crust-mantle evolution of the Earth, GOLDSCHMIDT (CHICAGO, USA)**

Oral presentation 2023 **Botero, M., Vervoort, J.D., and Meira, V.T., (2023, July) The Paleoproterozoic record of the Sao Francisco craton from zircon U–Pb and Hf isotope systematics, 6IAS (PERTH, AUSTRALIA) - GRANITOIDS, CONTINENTS, LIFE AND PUNS: A WORKSHOP IN TRIBUTE TO HERVÉ MARTIN (CLERMONT-FERRAND, FRANCE)**

- Poster - 2023 **Botero, M., Vervoort, J.D., and Meira, V.T., (2023, July) The Paleoproterozoic record of the Sao Francisco craton from zircon U–Pb and Hf isotope systematics**, GOLDSCHMIDT (LYON, FRANCE), <https://doi.org/10.7185/gold2023.14639>
- Poster - 2022 **Botero, M., Vervoort, J. D., and Corfu, F., (2022, March) Crustal Evolution of the Lofoten - Vesteralen Area in Norway Through Solution Hf Isotope, Coupled U-Pb and Hf Isotopic Analysis and Garnet Geochronology**, GPSA RESEARCH EXPOSITION - WSU
- Poster - 2021 **Botero, M., Vervoort, J. D., and Corfu, F., (2021, December) Crustal Evolution of the Lofoten - Vesteralen Area in Norway Through Solution Hf Isotope, Coupled U-Pb and Hf Isotopic Analysis and Garnet Geochronology**. In AGU Fall Meeting Abstracts (Vol. 2021 DI25A-0020), AGU - 2021
- Oral presentation 2017 **Botero, M., Vinasco, C. J., and Restrepo, S.A., (2017, August) Provenance of the Penderisco and Beibaviejo Formations through U-Pb and Hf analysis**, CONGRESO COLOMBIANO DE GEOLOGÍA (CCG) 2017
- Poster - 2017 **Botero, M., et al. (2017, August) Tectono-thermal evolution of the Mande Batholith through thermo-kinematic inverse modelling: implications on the Panama-Choco Block evolution**, CONGRESO COLOMBIANO DE GEOLOGÍA (CCG) 2017
- Poster - 2015 **Botero, M., et al. (2015, August) Thermal modelling of Mande batholith through low temperature thermo-chronology (ZFT, ZHe and AHe)**, CONGRESO COLOMBIANO DE GEOLOGÍA (CCG) 2015
- Poster - 2014 **Botero, M., et al. (2014, April) Timing of accretion and mountain-building response in the northern Andes of Colombia through low-temperature thermochronology analysis**, 9TH SOUTH AMERICAN SYMPOSIUM ON ISOTOPE GEOLOGY (SSAGI)

Grants

- 2022 - 2025 **National Science Foundation–Division of Earth Sciences**, P.I. JEFFREY VERVOORT, WSU
 Title: The Paleoproterozoic–A Pivotal Time in Earth Crustal Evolution–the View from the Zimbabwe and Sao Francisco Cratons
 Grant number: 2222254
 Amount awarded: 273,218.00 USD
 Role on Project: Research assistant - Ph.D. student
- Summer 2025 **Graduate Scholarship**, W. FRANK SCOTT ENDOWMENT - WSU, 2241.77 USD
- Summer 2025 **Graduate Scholarship**, JAMES W. CROSBY MEMORIAL SCHOLARSHIP - WSU, 2000 USD
- Summer 2024 **Graduate Scholarship**, REYNOLDS-BIERSNER SCHOLARSHIP IN GEOLOGY - WSU, 3000 USD
- Summer 2024 **Graduate Fellowship**, ROGER V. LECLERC II MEMORIAL FELLOWSHIP - WSU, 1500 USD
- 2020 - 2024 **Fulbright-Minciencias**, SCHOLARSHIP FOR A DOCTORAL DEGREE, 310,869.24 COP / ~80000 USD
- July 2023 **Planetary Science Grant-NASA**, GOLDSCHMIDT TRAVEL GRANT, 1000 USD
- July 2023 **6th International Archean Symposium travel grant**, 6IAS TRAVEL GRANT, 2000 AUD
- 2023 - 2024 **Graduate Scholarship**, SCHROEDER SCHOLARSHIP IN GEOLOGY - WSU, 4500 USD
- 2023 - 2024 **The Geological Society of America (GSA)**, GRADUATE STUDENT RESEARCH GRANT, 2500 USD
- 2022 - 2023 **Graduate Scholarship**, CRAFT FAMILY SCHOLARSHIP - WSU, 2100 USD
- Fall 2022 **Graduate Fellowship**, H. WALTER AND JEANNETTE PRAETORIUS - EXXON - WSU, 3400 USD
- Summer 2022 **Graduate Fellowship**, WILLIAM & MARY LYNN GRABER ENDOWMENT IN SCIENCES - WSU, 4000 USD
- 2022 - 2023 **The Geological Society of America (GSA)**, GRADUATE STUDENT RESEARCH GRANT, 2000 USD
- Fall 2021 **Graduate Fellowship**, H. WALTER AND JEANNETTE PRAETORIUS - EXXON - WSU, 2000 USD

Honors and Awards

- September 2025 **Ten Outstanding Young Persons 2025 regional section**. Awardee in leadership and academic achievements, TOYP - QUINDIO, COL
- August 2025 **Recognition to the leadership and achievements in academia and science**, HOUSE OF REPRESENTATIVES - QUINDIO, COL
- March 2025 **College of Arts and Sciences Doctorate Student Achievement Award - in the Sciences**, CAS - WSU

- May 2024 **Outstanding Graduate Student Researcher/Research Assistant Award**, SCHOOL OF THE ENVIRONMENT - WSU
- 2016 - 2017 **Universidad Nacional of Colombia, ACADEMIC EXCELLENCE SCHOLARSHIP**

Research Experience

- Fall 2025 - present **Postdoctoral research**, UNIVERSITY OF ARIZONA
- Early Earth evolution from short-lived radionuclides
 - Postdoctoral research associate at LASERCHRON
- Fall 2020 - Fall 2025 **Ph.D. research project**, WASHINGTON STATE UNIVERSITY
- Creating Earth's earliest continents - the view from the Zimbabwe and Sao Francisco cratons (UPb, Lu-Hf, and Sm-Nd isotope systematics)
 - Crustal evolution of the Lofoten - Vesterålen area in Norway through solution Hf isotope and coupled U-Pb and Hf isotope analysis.
- 2016 - 2018 **Master's research project**, U. NACIONAL DE COLOMBIA
- Provenance and structural response of the Penderisco and Beibaviejo formations: Implications on the Cenozoic accretionary history of the northern Andes of Colombia.
- Fall 2016 **Research visitor**, UNIVERSITY OF FLORIDA (UF)
- U-Pb and Hf isotope analysis
 - Zircon and Apatite U-Th-He dating
- 2013 - 2015 **Research assistant**, U. NACIONAL DE COLOMBIA
- Timing of accretion and mountain-building response in the northern Andes of Colombia through low-temperature thermochronology analysis
- 2014 **Undergraduate student in research project**, U. NACIONAL DE COLOMBIA
- Study and installation of a GigaPan system for digital image analysis in structural geology applications through textural studies on rock outcrops with high resolution photography
- April 2014 **Research visitor**, UNIVERSITY OF SÃO PAULO, Brazil
- Shape preferred orientation in rock samples

Teaching and Mentoring Experience

- Spring - Fall 2024 **Mentoring high-school level student Azumi Valencia - Tracking Archean Crustal Growth of the Zimbabwe Craton through Modern Sediments**, WSU, School of the Environment
- Fall 2024 **Teaching assistant of Field Skills for Earth Scientists**, WSU, School of the Environment, USA
- Spring 2022 **Teaching assistant of Earth's History and Evolution**, WSU, School of the Environment, USA
- Spring 2021 **Teaching assistant of Introduction to Geology**, WSU, School of the Environment, USA
- Spring 2020 **Instructor of Structural Geology**, U. ESCUELA DE INGENIERIA DE ANTIOQUIA - EIA, Colombia
- 2018 - 2020 **Instructor of Laboratory of Physical Geology**, U. NACIONAL DE COLOMBIA, School of Mines, Colombia
- Summer 2019 **Instructor of Geology for Engineers and Fundamental of Geotechnical Engineering**, POLITECNICO JAIME ISAZA, Faculty of Engineering, Colombia
- Summer 2019 **Academic advisor of internships in Civil Engineering**, POLITECNICO JAIME ISAZA, Faculty of Engineering, Colombia
- 2017 - 2018 **Instructor of Analysis of Geological Structures**, U. NACIONAL DE COLOMBIA, School of Mines, Colombia
- 2016 - 2017 **Teaching Assistant of Tectonic and Structural Geology**, U. NACIONAL DE COLOMBIA, Faculty of Mines, Colombia

Outreach and Service Activities

- 2024 **Invited speaker**, WSU, 4H Teen conference
- 2024 **Co-organizer of Earth sciences workshop – The Floor is Lava**, WSU, 4H Teen conference
- 2024-2025 **Critical minerals search committee member**, WSU, School of the Environment
- 2023-2025 **President of the Geology Club**, WSU, School of the Environment
- Organizing weekly coffee hours
 - Organizing field trips with undergraduate and graduate students
 - Leading monthly DEI discussions
- 2022 and 2023 **Fulbright Scholarship Proposal Review Panel**, COLOMBIA
- 2022 **Grants and Contracts Coordinator hiring committee member**, WSU, School of the Environment