Christopher A. Parendo

Postdoctoral Fellow
Dept. of Earth & Planetary Sciences, Harvard University
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RESEARCH INTERESTS

stable and radiogenic isotope geochemistry, subduction zones and arc volcanism, ophiolites, hydrothermal alteration at ocean-spreading ridges, marine elemental cycles, sediment geochemistry, petrology, cosmochemistry & planetary science, mass spectrometry (TIMS and especially MC-ICPMS), chemical separations, geochemical and thermodynamic modeling

EDUCATION

Ph.D., Earth and Planetary Sciences — April, 2021
Harvard University — Cambridge, MA
Dissertation title: Potassium-isotope systematics in subducting materials and arc lavas
Advisor: Stein B. Jacobsen

M.A., Earth and Planetary Sciences — 2014
Harvard University — Cambridge, MA

B.S., Geology; B.A., English — 2009
George Washington University — Washington, DC
summa cum laude

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow — April 2021 – Present
Harvard University — Cambridge, MA

Reserve Teacher — Math, Science, English — 2010 – 2012
Minneapolis Public Schools — Minneapolis, MN

Tutor — Math, Science, English — 2009 – 2012
Independent — Minneapolis, MN

Research Assistant — June – August, 2008; June – July, 2007
George Washington University — Washington, DC

AWARDS

Presidential Scholarship — George Washington University — 2005 - 2009

Phi Beta Kappa		2009
Luther Rice Fellowship	George Washington University	2008
Foshag Scholarship	Mineralogical Society of DC	2007

PUBLICATIONS

Parendo, C.A., Jacobsen, S.B., Petaev, M.I., Calcium-isotope and REE constraints on the thermal history of CAIs in the solar nebula (*in prep*)

Parendo, C.A., Jacobsen, S.B., Plank, T., (2022) Potassium-isotope variations of marine sediments adjacent to the Izu-Bonin Trench and Nankai Trough. *Geochimica et Cosmochimica Acta*, 337, 166-181. (https://doi.org/10.1016/j.gca.2022.08.007)

Parendo, C.A., Jacobsen, S.B., Kimura, J.I., Taylor, R., (2022), Across-arc variations in K-isotope ratios in lavas of the Izu arc: Evidence for progressive depletion of the slab in K and similarly mobile elements. *Earth and Planetary Science Letters*, 578, 117291. (https://doi.org/10.1016/j.epsl.2021.117291)

Parendo, C.A., Jacobsen, S.B., Wang, K. (2017) K isotopes as a tracer of seafloor hydrothermal alteration. *Proceedings of the National Academy of Sciences*, 114 (8), 1827-1831. (https://doi.org/10.1073/pnas.1609228114)

Tollo, R.P., Aleinikoff, J.N., Mundil, R., Southworth, S.C., Cosca, M.A., Rankin, D.W., Rubin, A.E., Kentner, A., **Parendo, C.A.**, Ray, M.S. (2012) Igneous activity, metamorphism, and deformation in the Mount Rogers area of SW Virginia and NW North Carolina: A geologic record of Precambrian tectonic evolution of the southern Blue Ridge Province. *Field Guides* 29:1-66. (https://doi.org/10.1130/2012.0029(01))

CONFERENCE ABSTRACTS & PRESENTATIONS

Parendo, C.A., Jacobsen, S.B., Petaev, M.I., (2024) Constraints on CAI formation from Ca isotopes and kinetic-equilibrium modeling. *Goldschmidt 2024, Chicago.*

Loeb, A., Jacobsen, S.B., Adamson, T., Bergstrom, S., Cloete, R., Cohen, S., Conrad, K., Domine, L., Fu, H., Hoskinson, C., Hyung, E., **Parendo, C.A.**, et al. (2024) Spherules Recovered from the Pacific Ocean Site of the CNEOS 2014-01-08 (IM1) Bolide. LPI Contributions, 30240, *LPSC Conference 2024*.

Parendo, C.A., Jacobsen, S.B., Petaev, M.I., (2023) Calcium-isotope and REE constraints on the thermal history of CAIs in the solar nebula. *AGU Fall Meeting 2023, San Francisco*.

Jacobsen, S.B., **Parendo, C.A.**, Eriksen, Z.T., Fu, H., Gerard, Yvan (2023) The Nu Sapphire SP001 collision cell MC-ICP mass spectrometer: Application to high-precision measurements of K and Ca isotopes. *Goldschmidt 2023, Lyon*.

Parendo, C.A., Jacobsen, S.B., Petaev, M.I., (2023) Calcium isotope fractionation in CAIs arising from thermal processing in the solar nebula. *Goldschmidt 2023, Lyon, Remote Attendee.*

Parendo, C.A., Jacobsen, S.B., Kimura, J.I., Taylor, R., (2020) Tracing material transport in subduction zones: Insights from K isotopes in Izu arc lavas. *AGU Fall Meeting 2020, Virtual*.

Parendo, C.A., Jacobsen, S.B., Yamashita, K., Okano, O. (2018) K and Sr isotope variations in boninite-series lavas from the Izu-Bonin forearc. *Goldschmidt 2018, Boston*.

Parendo, C.A., Jacobsen, S.B., Yamashita, K., Okano, O. (2017) Potassium isotope variations in forearc boninite-series volcanics from Chichijima. *AGU Fall Meeting 2017, New Orleans*.

Parendo, C.A., Jacobsen, S.B., Wang, K. (2016) Potassium isotopes as a new tracer of seafloor hydrothermal alteration: The Bay of Islands Ophiolite. *AGU Fall Meeting 2016, San Francisco*.

Sedaghatpour, F., **Parendo, C.A.**, Jacobsen, S.B. (2015) Ca isotopes, the Moon's origin and magmatic evolution. *Goldschmidt 2015, Prague*.

Parendo, C.A., Tollo, R.P. (2012) Petrogenesis of an ash-flow breccia, Mount Rogers, Virginia. *GSA Southeastern Section Meeting, Asheville*.

LABORATORY EXPERIENCE

Harvard Cosmochemical Laboratory:

- Thermal Ionization Mass Spectrometry (TIMS), primarily for analysis of Ca isotopes using double-spike methods
    - GV Instruments Isoprobe-T
- Multi-Collector Inductively Coupled Plasma Mass Spectrometry (MC-ICPMS), primarily for analysis of K, Ca, Sr, and Fe isotopes
    - GV Instruments Isoprope-P, Nu Plasma II, and Nu Sapphire
- Development of new or refined analytical procedures for new instruments — e.g., extensive work pertaining to the first-delivered Nu Sapphire MC-ICPMS with Collision Cell (CC-MC-ICPMS)
- Quadrupole Inductively Coupled Plasma Mass Spectrometry (Quad-ICPMS) for analysis of major and trace element concentrations
    - Thermos iCap-Q, and iCap Triple-Quad
- Some experience with Electron Microprobe Analysis
- Sample processing, silicate rock dissolution, chemical separations of Ca, K, Sr, and Fe

Harvard X-Ray Laboratory:

- X-ray diffraction (XRD) analysis
    - Bruker D2 Phaser

Harvard Chemical Oceanography Laboratory:

- Gas Source Isotope Mass Spectrometry for analysis of C and O isotopes

Stanford SHRIMP-RG Laboratory:

- Operated (2 days while an undergraduate) Sensitive High Resolution Ion Microprobe (SHRIMP) to obtain elemental data from multi-domain zircons

GEOCHEMICAL MODELING EXPERIENCE

- Gibbs minimization (optimization) algorithms for chemical equilibrium calculations
- 1D advection-diffusion water-sediment interaction (diagenesis) models
- Water-rock (and magma-rock) interaction as described by zone-refining, assimilation & fractional crystallization, partial melting, mixing, or various other transport processes
- Evaporation-condensation kinetic processes
- Geochronology or radiogenic isotope calculations

FIELD EXPERIENCE

- Oslo Rift and surrounding area, Norway
  - Field trip as Teaching Fellow for course EPS-51 — October, 2018 (5 days)
  - Field trip with Harvard Origins Consortium — August, 2017 (9 days)
- Leka Ophiolite, Norway
  - Excursion to collect ophiolite samples — July, 2015 (8 days)
- Neoproterozoic sedimentary successions, Death Valley, California
  - Field trip with NASA Astrobiology – MIT Group — January, 2014 (4 days)
  - Field mapping course, Neoproterozoic sediments — January, 2013 (3 weeks)
- Mount Rogers Volcanic Complex of southern Virginia
  - Field mapping, sample processing, and related work — June - August, 2008
- Grenville Orogen in Blue Ridge Province, Virginia
  - Field mapping, sample processing, and related work — June - July, 2007

TEACHING AND OUTREACH EXPERIENCE

Teaching Fellow at Harvard University

EPS51: Introduction to Planetary Materials and Earth Resources — Fall, 2018
- Led weekly section, co-leader for Norway field trip and final project

SPU31: Energy Resources and the Environment — Spring, 2018

EPS240: Isotope and Trace Element Geochemistry and Geochronology — Fall, 2017

EPS/OEB56: Geobiology and the History of Life — Spring, 2014

Reserve Teacher at Minneapolis Public Schools — 2010 - 2012
Math, Science, English

Tutor 2009 - 2012
Math, Science, English

Teaching Assistant at George Washington University

GEOL002: Historical Geology Spring, 2009

Freelance Contributor to Geotimes Magazine (Science Writing) 2008
- Contributed three articles to website and print magazine

ACADEMIC SERVICE

Peer Reviewer for Journals: Geology, Earth & Planetary Science Letters, Geochimica et Cosmochimica Acta

Session Convener, 2018 Goldschmidt Conference. Session Title: "Bright Future – Recent Methodological and Instrumentation Advances for Micro- to Nano-Analysis in Earth and Planetary Science"

Visiting Lecture Organizer for 2014 Agassiz Visiting Lecture at Department of Earth and Planetary Sciences, Harvard University – An annual multi-day series of lectures by an invited speaker.

PROFESSIONAL MEMBERSHIPS

American Geophysical Union, Geochemical Society