

# Sandrine Péron

Marie Skłodowska-Curie Actions Fellow, ETH Zürich

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ResearcherID [H-6017-2017](https://www.researcherid.com/rid/H-6017-2017)

## Education

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- 09.2015 - 12.2018 **Institut de Physique du Globe de Paris, Université Paris 7, France**  
Ph.D., Earth Sciences. *Origin of volatiles on Earth: constraints from noble gases*  
Advisor: Prof. Manuel Moreira
- 09.2013 - 06.2015 **Ecole Normale Supérieure de Lyon and Université Lyon 1, France**  
M.Sc. in Earth Sciences (Geochemistry and Geophysics), with highest distinction.  
Diploma of Ecole Normale Supérieure de Lyon (DENS).
- 09.2012 - 06.2013 **Ecole Normale Supérieure de Lyon and Université Lyon 1, France**  
B.Sc. in Earth Sciences.
- 09.2010 - 07.2012 **Lycée Chateaubriand, Rennes, France**  
Two-year intensive course preparing for the competitive entrance examinations to the French 'Grandes Ecoles' (leading institutions of higher education).  
Main courses: Biology, Geology, Physics, Chemistry and Mathematics.

## Professional experience

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- 09.2021 - present **Postdoctoral Fellow, ETH Zürich, Switzerland**  
Advisor: Prof. Henner Busemann
- 05.2019 - 08.2021 **Postdoctoral Scholar, University of California Davis, USA**  
Advisor: Prof. Sujoy Mukhopadhyay
- 01.2019 - 03.2019 **Postdoctoral researcher, Institut de Physique du Globe de Paris, France**  
Advisor: Prof. Manuel Moreira
- 09-2018 - 12.2018 **Temporary teaching and research assistant (ATER) Institut de Physique du Globe de Paris, France**  
40h of teaching. Geochemistry at Université Paris 7 and ENS Paris.
- 09.2015 - 08.2018 **PhD student and teaching assistant, Université Paris 7, ENS Paris, France**  
Geochemistry, Petrology, Cartography for undergraduates, 64h/yr.  
'Cordée de la réussite' (scientific tutoring) for highschool students (2016-2017).
- 01.2015 - 06.2015 **Master's thesis (# 2), Institut de Physique du Globe de Paris, France**  
Supervisor: Prof. Manuel Moreira. Noble gas origin on Earth from oceanic island basalt analyses.
- 05.2014 - 07.2014 **Master's thesis (# 1), Istituto Nazionale di Geofisica e Vulcanologia, Pisa, Italy**  
Supervisor: Dr. Margherita Polacci. Study of the vesiculation of volcanic samples
- 2013 **Undergraduate internships (3 months), LGL-TPE, ENS Lyon, France**  
Supervisor: Prof. Stéphane Labrosse. Study of heat fluxes on the Earth's surface and at the CMB

## Awards and honors

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- Marie Skłodowska-Curie Actions Individual Fellowship, award number: 101022657, 2021-2023 (~ 200 k€ personal research grant for a project to be conducted at ETH Zürich, started Nov. 2021)
  - Pete Burnard Award, to an early career scientist for significant analytical development in noble gas chemistry, 2019 (<https://sites.google.com/view/dingue2019/award>)
  - L'Oréal-UNESCO *For Women in Science* fellowship, award recipient, 2017 (15 k€, 30 recipients over 1002 candidates)
  - PhD fellowship from ENS Lyon (French Ministry of Education and Research), 2015-2018

## Teaching experience

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Geochemistry,	UFR STEP, University Paris 7,	Undergrad 3 <sup>rd</sup> year,	TD 20h	2015
Geosciences 3: chemical geodynamics,	UFR STEP, University Paris 7,	Undergrad 2 <sup>nd</sup> year,	TD 126h	2015-2018
Geochemistry,	ENS Paris,	Undergrad 3 <sup>rd</sup> year,	TD 28h	2015-2018
Geology (petrology),	UFR STEP, University Paris 7,	Undergrad 2 <sup>nd</sup> year,	TP 48h	2016-2018

## Advising experience

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- Lisa Eckart, PhD candidate at ETH Zürich, co-advised with Prof. Henner Busemann, 2021-2022
  - Marion Prémont, undergraduate internship (1 month), co-advised with Prof. Manuel Moreira, 2017

## Field experience

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2016 **Oceanographic cruise AT33-03 on R/V Atlantis, PI Mark Kurz**  
"Popping Rock" mission on the Mid-Atlantic Ridge (14°N) (<http://poppingrocks.who.edu/>)

## Professional affiliations and service

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- Journal reviewer for *Chemical geology*, *Communications Earth & Environment*, *Earth and Planetary Science Letters*, *Geochimica et Cosmochimica Acta*, *Geosciences*, *Nature Geoscience*, *Proceedings of the National Academy of Sciences of the United States of America*
  - External grant reviewer for Institut National des Sciences de l'Univers (INSU), CNRS, France
  - Reviewer for National Science Foundation (USA)
  - Non-Panelist Reviewer for NASA
  - Member of the swiss consortium NCCR PlanetS (<http://nccr-planets.ch/>)
  - European Association of Geochemistry, member, 2016-present
  - American Geophysical Union, member, 2015-present

## Publications in peer-reviewed journals

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10. Péron, S., Mukhopadhyay, S., 2022. Krypton in the Chassigny meteorite shows Mars accreted chondritic volatiles before nebular gases. *Science* 10.1126/science.abk1175.
  9. Péron, S., Mukhopadhyay, S., 2022. Pre-subduction mantle noble gas elemental pattern reveals larger missing xenon in the deep interior compared to the atmosphere. *Earth and Planetary Science Letters* 593, 117655.
  8. Péron, S., Mukhopadhyay, S., Kurz M. D. and Graham, D. W., 2021. Deep-mantle krypton reveals Earth's early accretion of carbonaceous matter. *Nature* 600, 462-467.
  7. Péron, S., Mukhopadhyay, S. and Huh, M., 2020. A new dual stainless steel cryogenic trap for efficient separation of krypton from argon and xenon. *Journal of Analytical Atomic Spectrometry* 35, 2663-2671, doi:10.1039/D0JA00052C.
  6. Péron, S., Moreira, M., Kurz, M., Curtice, J., Blusztajn, J., Putlitz, B., Wanless, V. D., Jones, M. R., Soule, S. A. and Mittelstaedt, E., 2019. Noble gas systematics in new popping rocks from the Mid-Atlantic Ridge (14 °N): Evidence for small-scale upper mantle heterogeneities. *Earth and Planetary Science Letters* 519, 70-82.
  5. Jones, M. R., Wanless, V. D., Soule, S. A., Kurz, M., Mittelstaedt, E., Fornari, D. J., Curtice, J., Klein, F., Le Roux, V., Brodsky, H., Péron, S. and Schwartz, D. M., 2019. New constraints on mantle carbon from Mid-Atlantic Ridge popping rocks. *Earth and Planetary Science Letters* 511, 67-75.
  4. Péron, S. and Moreira, M., 2018. Onset of volatile recycling into the mantle determined by xenon anomalies. *Geochemical Perspectives Letters* 9, 21-25.
  3. Péron, S., Moreira, M. and Agranier, A., 2018. Origin of light noble gases (He, Ne, and Ar) on Earth: a review. *Geochemistry, Geophysics, Geosystems*, 19. <https://doi.org/10.1002/2017GC007388>.
  2. Péron, S., Moreira, M., Putlitz, B. and Kurz, M., 2017. Solar wind implantation supplied light volatiles during the first stage of Earth accretion. *Geochemical Perspectives Letters* 3, 151-159.
  1. Péron, S., Moreira, M., Colin, A., Arbaret, L., Putlitz, B. and Kurz, M., 2016. Neon isotopic composition of the mantle constrained by single vesicle analyses. *Earth and Planetary Science Letters* 449, 145-154.

## Invited seminars

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- Delivery of volatiles to terrestrial planets: clues from krypton isotopes, Jet Propulsion Laboratory, June 2022
- Delivery of volatiles to terrestrial planets: a perspective from heavy noble gases, Lunar and Planetary Institute Seminar Series, February 2022
- Insights into volatile accretion on Earth and Mars from krypton isotopes, Geochemistry and Cosmochemistry Group of the University of Manchester, February 2022
- Volatile sources and subsequent recycling into the Earth's mantle: insights from noble gas geochemistry, University of California Davis, 2020
- Recycling of atmospheric noble gases into the mantle. Workshop Les Treilles organized par B. Marty et C. Ballentine, 2019
- Origin and evolution of light noble gases in the Earth's mantle, University of California Davis, 2018
- Origin and evolution of light noble gases in the Earth's mantle, C.R.P.G. Nancy, 2018
- Origin and evolution of light noble gases in the Earth's mantle, I.U.E.M. Brest, 2018
- Noble gas systematics on new popping rocks from the Mid-Atlantic Ridge (~ 14 °N), Woods Hole Oceanographic Institution, 2018

## Conference proceedings

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- Huh, M., **Péron, S.**, Mukhopadhyay, S. Tracking Temporal Trends in Volatiles Sources to the Earth From the Isotopic Fingerprints of Krypton and Xenon. *32<sup>nd</sup> Goldschmidt Conference*, July 2022 (oral)
- Mukhopadhyay, S, Huh, M., **Péron, S.**. Early volatile degassing and the pre-subduction noble gas elemental pattern of the mantle. *32<sup>nd</sup> Goldschmidt Conference*, July 2022 (oral)
- Mukhopadhyay, S., **Péron, S.** Mars interior accreted chondritic volatiles in the presence of a gas disk. *53<sup>rd</sup> Lunar and Planetary Science Conference*, March 2022 (oral, abstract number 2851)
- **Péron, S.**, Mukhopadhyay, S., Kurz, M. D. and Graham, D. W. A Perspective from Earth's Deep Mantle Krypton and Xenon on Evolution of Planetary Interiors. *AGU Fall meeting*, December 2021 (**invited**, oral DI23A-05)
- Huh, M., **Péron, S.**, Mukhopadhyay, S. Provenance of Terrestrial Volatiles Determined from Non-radiogenic Krypton and Xenon Isotopes in MORBs. *AGU Fall meeting*, December 2021 (poster DI25C-0052)
- **Péron, S.**, Mukhopadhyay, S. The heavy noble gas composition of the Martian mantle: implications for accretion of volatiles on Earth and Mars. *31<sup>st</sup> Goldschmidt Conference*, July 2021 (oral)
- **Péron, S.**, Mukhopadhyay, S., Kurz, M. D. and Graham, D. W. A nucleosynthetic krypton anomaly identified in the Earth's deep mantle. *D.I.N.G.U.E. 7 workshop*, June 2021, virtual (oral)
- Mukhopadhyay, S., **Péron, S.** The story of Earth's volatile accretion and evolution. *Japan Geoscience Union Meeting*, 2021
- **Péron, S.**, Mukhopadhyay, S., Kurz, M. D. and Graham, D. W. Insights into Earth accretion from deep mantle Kr isotopes. *AGU Fall meeting*, december 2020, (oral DI021-09)
- **Péron, S.**, Mukhopadhyay, S. and Kurz, M. D. The heavy noble gas (Kr, Xe) composition of the Galápagos hotspot: Insights into the origin and evolution of mantle volatiles. *30<sup>th</sup> Goldschmidt Conference*, June 2020, virtual conference
- **Péron, S.**, Moreira, M. Onset of volatile recycling into the mantle determined by xenon anomalies. *29<sup>th</sup> Goldschmidt Conference*, août 2019, Barcelone (oral)
- **Péron, S.**, Moreira, M. Origin of volatiles and onset of volatile recycling into the mantle determined by xenon anomalies. *D.I.N.G.U.E. 6 workshop*, août 2019, Zurich (oral)
- Kurz, M. D., Curtice, J., Jones, R., **Péron, S.**, Mittelstaedt, E., Wanless, V. D., Soule, S. A. and Fornari, D. J. New Noble Gas and Volatile Measurements in basalt glasses from the Mid-Atlantic Ridge near 14 ° North. *AGU Fall meeting*, December 2018 (oral)
- Jones, M. R., Soule, S. A., Kurz, M., Wanless, V. D., Brodsky, H., Bendana, S., Schwartz, D., **Péron, S.**, Klein, F., Le Roux, V., Mittelstaedt, E., Fornari, D. J. and Curtice, J. Interpreting popping rocks from the Mid-Atlantic Ridge near 14N. *28<sup>th</sup> Goldschmidt Conference*, August 2018, Boston (poster)
- Jones, M. R., Wanless, V. D., Soule, S. A., Kurz, M., Mittelstaedt, E., Fornari, D. J., Curtice, J., Klein, F., Le Roux, V., Brodsky, H., **Péron, S.** and Schwartz, D. New constraints on mantle carbon from Mid-Atlantic Ridge popping rocks. *Gordon Research Conference on Deep Carbon*, June 2018 (poster)

- Kurz, M. D., Curtice, J., Jones, R., **Péron, S.**, Wanless, V. D., Mittelstaedt, E., Soule, S. A., Klein, F. and Fornari, D. J. New Noble Gas Studies on Popping Rocks from the Mid-Atlantic Ridge near 14 °N. *AGU Fall meeting*, December 2017 (poster)
- **Péron, S.**, Moreira, M., Putlitz, B. and Kurz, M. Solar wind implantation supplied light volatiles during the first stage of Earth accretion. *27<sup>th</sup> Goldschmidt Conference*, August 2017, Paris (oral)
- **Péron, S.**, Moreira, M., Kurz, M., Curtice, J. and Putlitz, B. What new popping rocks from the Mid-Atlantic Ridge (~ 14° N) tell us? *D.I.N.G.U.E. 5 workshop*, August 2017, Paris (oral)
- **Péron, S.**, Moreira, M., Putlitz, B. and Kurz, M. Solar wind implantation supplied light volatiles during the first stage of Earth accretion. *ACCRETE workshop*, June 2017, Nice (oral)
- Kurz, M. D., Mittelstaedt, E., Wanless, V. D., Soule, S. A., Fornari, J. M., Jones, M. R., D. J., Curtice, **Péron, S.**, Klein, F., Schwartz, D., Kaminski, K. and Escartín, J. Popping rocks from the Mid-Atlantic Ridge at 13.77 °N. *AGU Fall meeting*, December 2016 (oral)
- Moreira, M., **Péron, S.** and Colin, A. Elemental and isotopic compositions of noble gases in the mantle: Pete's path *EGU General Assembly*, avril 2016 (oral)
- **Péron, S.**, Moreira, M., Colin, A., Arbaret, L., Putlitz, B. and Kurz, M. Neon isotopic composition of the mantle constrained by single vesicle analyses. *D.I.N.G.U.E. 4 workshop*, April 2016, Nancy (oral)
- **Péron, S.**, Moreira, M., Colin, A., Arbaret, L., Putlitz, B. and Kurz, M. Neon isotopic composition of the mantle constrained by single vesicle analyses. *AGU Fall meeting*, December 2015, San Francisco (Poster D131A-2569)