Sarah Lambart

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Academic appointments

Assistant Professor in Igneous Processes — Since March 2018
University of Utah - Department of Geology and Geophysics

MSCA-COFUND Fellow — Jan. 2017 - Jan. 2018
Cardiff University - School of Earth and Ocean Sciences

Visiting Assistant Professor — Jul. 2015 - Dec. 2016
University of California Davis - Department of Earth and Planetary Sciences

Lamont Postdoctoral Fellow — Sep. 2013 - Jun. 2015
Columbia University - Lamont-Doherty Earth Observatory

Postdoctoral Scholar — Sep. 2010 - Aug. 2013
Caltech - Division of Geological and Planetary Sciences

Education

2006-2010: Ph.D. in Earth Sciences, Blaise Pascal University, France
2004-2006: MS Earth Sciences, Blaise Pascal University, France
2001-2004: BS Earth Sciences, Blaise Pascal University and Rennes I University, France

Research interests

- Mantle melting and magma transport
- Magma/Fluid - Rock interactions
- Mantle heterogeneities
- Magma chamber processes
- Mineral carbon sequestration

Key skills:

- experimental: Piston-cylinder, 1 atm. gas-mixing furnaces, triaxial deformation apparatus
- analytical: Electron microprobe (JEOL JXA-8200 and CAMECA SX100), Scanning Electron Microscopy (Zeiss Sigma Analytical SEM and Jeol 5910-SV), TIMS (TRITON-Plus), Optical Microscopy; occasional user: LA-ICP-MS, FTIR spectroscopy, X-ray microtomography, MC-ICP-MS (Nu Plasma2)
- modeling: alphaMELTS (MELTS, pMELTS and pHMELTS); occasional user: MATLAB

Grants and fellowships

- "Development of an experimental technique to study magma migration" (**Lead PI,** CMES Seed grant, 03/01/19-02/28/2020, $22k) – **2019**
- "Investigation of the melt-rock reaction in the lower oceanic crust." (**Lead PI,** CUROP project: 06/17-08/17, £1600) – **2017**
- ''MORB2Mantle: tracking mid-ocean ridge basalt from source to seafloor'' (**MSCA-COFUND fellowship**: 01/17-12/19; ~£255k) – **2016**
- ''Near-fractional melting of pyroxenite: Experimental investigations and applications to basalt petrogenesis'' (**Lead PI**, NSF-EAR: 06/16-05/19; $154k) – **2016**
- ''A combined experimental and theoretical investigation to reactive flow in brittle media with applications to solid Earth geodynamics'' (**Postdoc co-author**, NSF-EAR: 06/15-05/17; $409k) – **2015**
- ''Collaborative Research: Alteration of mantle peridotite: Geochemical fluxes and dynamics of far from equilibrium transport (**Postdoc co-author**, NSF-EAR: 09/15-08/18; $2,972k, LDEO part: $1,968k) – **2015**

- *"*Experimental & Theoretical Studies of Reaction-Driven Cracking in Natural &Engineered Geological Systems'' (**co-PI,** RISE award: 06/14-05/16; $160k) – **2013**
- **Postdoctoral fellowship** (one year of full-time funding at LDEO) – **2012**
- University **travel grant** for the Melt-glass-magmas short course, München, Germany – **2008**
- **PhD Scholarship** ''MESR'' (three years of full-time funding) – **2006**
- **National scholarship** for highly ranked students – **2005**

Invited talks and seminars:

2020: Guest speaker for the Geologists of Jackson Hole (https://geologistsofjacksonhole.org/), WY-USA, May 2020
Stout Lecture at University of Nebraska, Lincoln, NE-USA, Apr. 2020
Invited lecturer for the second edition of the International Mantle School MEREMA (http://www.socminpet.it/Merema/), Sestri Levante, IT, Apr. 2020
Departmental seminar at Utah State University, UT-USA, Mar. 2020
Departmental seminar at Laboratoire Magmas et Volcans, Clermont-Ferrand, FR, Jan. 2020

2019: Invited talk at the AGU Fall meeting, San Francisco, CA, Dec. 2019
Departmental seminar at University of Iowa, IA-USA, Nov. 2019

2018: Departmental seminar at Brigham Young University, UT-USA, Oct. 2018
Departmental seminar at Utah Valley University, UT-USA, Oct. 2018

2017: Invited talk at the Goldschmidt conference, Paris-FR, Aug. 2017
Departmental seminar at the University of Utah, UT-USA, Feb. 2017
Seminar at CRPG, Nancy, FR, Feb. 2017

2016: Seminar at the University of Nevada, Reno, NV-USA, Sep. 2016

2015: Invited talk at the Geological Society of America Annual Meeting, Nov. 2015
Geoscience seminar & Journal club seminar at Aahrus University, DK, Mar. 2015
Geochemistry seminar at Lamont-Doherty Earth Observatory, NY-USA, Mar. 2015
DTM weekly seminar at the Carnegie Institution, DC-USA, Mar. 2015

2014: Earth and Planetary Sciences Seminar at AMNH, NY-USA, Oct. 2014

2013: Geodynamics seminar at Lamont-Doherty Earth Observatory, NY-USA, Oct. 2013
Departmental seminar at Rice University, TX-USA, Jan. 2013

2012: Brown bag seminar at University of California Davis, CA-USA, Apr. 2015
Division seminar at Geosciences Montpellier, FR, Apr. 2015

2011: Magmas seminar at ISTO, Orléans, FR, Dec. 2011
General seminar at CRPG, Nancy, FR, Dec. 2011
General seminar at Laboratoire Magmas et Volcans, Clermont-Ferrand, FR, Dec. 2011

2010: Invited talk at the AGU Fall Meeting, Dec. 2010

2009: Special seminar at California Institute of Technology, Dec. 2009

Teaching:

University of Utah:

GEO 3020 – Mineralogy	Undergrad. (2018-)
GEO 3050 – Igneous and metamorphic Petrology	Undergrad. (2019-)

University of California Davis:

GEL 62 – Optical mineralogy	Undergrad. (2015)
GEL 60 – Mineralogy	Undergrad (2015-2016)
GEL 105 – Igneous Petrology	Undergrad (2016)
GEL 1 – The Earth	Undergrad (2016)

Lamont Doherty Earth Observatory:

Upper mantle seminar	Graduate (2013)

Université Blaise Pascal:

Mathematics applied to Earth Sciences	Undergrad. (2006-2009)
Volcanic Cartography	Graduate. (2006-2009)
Cartography 101	Undergrad. (2009)

Mentored Students:

Current

- Otto Lang (Graduate student; University of Utah; since summer 2019)
- Prospective student (graduate student; University of Utah; fall 2020)

- Sarah Hamilton (UROP Scholar; Senior thesis; University of Utah; since summer 2019)
- Elliott Gray (UROP Scholar; University of Utah; spring 2020)

Past:

- Paul Edwards (Master student; co-supervised with Chip Lesher; UC Davis 09/2016-09-2018)
- Valérie Payré (Master student; co-supervised with Ed Stolper; Caltech 03/2013-08/2013; now postdoc at Rice University)

- William Haddick (UROP Scholar; Senior thesis; University of Utah; fall 2018 & spring 2019; now Mine geologist for Graymont Western US Inc.)
- Matthew Cook (MESci student; Cardiff University; summer 2017; now PhD candidate at U. of Auckland)
- Cecilia Ajoku and Bryan Mccarty (senior undergrads; UC Davis summer & fall 2016)
- Ben Robinson (Research assistant; LDEO, summer 2016)

Graduate Students – Advisory Committee Member

- Samantha Couper, current PhD candidate, University of Utah (advisors: Lowell Miyagi & Marie Jackson)
- Kevin Mendoza, current PhD candidate, University of Utah (advisors: John Bartley & Phil Wannamaker)
- Joshua Marquardt, current MS student, University of Utah (advisors: Pete Lippert & Marie Jackson)

Professional development

- "Nature Masterclasses" workshop, University of Utah, Salt Lake City – May 2019
- alphaMELTS workshop, University of Maryland, College Park MD – Dec. 2018
- Workshop for Early Career Geoscience Faculty, University of Maryland, College Park MD – July 2018
- Visiting Scientist at V.U. Amsterdam, Netherland – Summer and fall 2017
- Geochemistry Group Research in progress, Bristol, UK – summer & fall 2017
- GeoPRISMS mini-workshop: "From rifting to drifting: evidence from rifts and margins worldwide", San Francisco (CA), USA – Dec. 2015
- DCO thematic institute: ''Carbon from the Mantle to the Surface", Berkeley (CA), USA – Jul. 2015
- CIDER Summer Program: ''Mantle Interactions with the Hydrosphere & Carbosphere", Berkeley (CA), USA – Jul. 2015
- RCN-CCUS annual meeting and workshop, New-York (NY), USA – Apr. 2014
- EarthCube DEFORM/COMPRES workshop, Alexandria (VA), USA – Nov. 2013
- Short course «MELTS Camp», Pasadena (CA), USA – Sep. 2011
- Short course «Melts, Glasses, Magmas», München, Germany – Jun. 2007
- Short course «Gros Volumes», Clermont-Ferrand, France – Apr. 2007

Field experience

- *2019*: Big Island, Hawaii – graduate & undergraduate field trip supervision (1 week)
- *2018:* Bonneville Salt Flats, UT, fieldwork - Seismometer deployment (1 day) ; Markagunk landslide, UT, fieldtrip led by Bob Biek, UGS (2 days)
- *2016:* Smartville complex, CA, fieldtrip supervision (1 day)
- *2014*: Oman ophiolite, Oman, fieldwork (two weeks); Beni Bousera, Morocco, Orogenic Lherzolite Conf., Field Forum (3 days)
- *2006-09*: Clermont-Ferrand area, France, field camp supervision (3 days every year); Massif Central, France, field camp supervision (1 week every year)
- *2004-06:* Aeolian Islands, Italy, field seminar (1 week); Alps, France and Italy, field course (1week); Cap Creus, Spain, field course (1 week); Chaîne des Puys, France, reflection seismology short course (3 days); Ardèche, France, field course (1 week); Corbière, France, field course (1 week); Pic Saint Loup, France, field course (1 week)

Service & Outreach

Current

- Convener and chair of the session « Formation and Modification of the Lithospheric Mantle through time», Goldschmidt, Honolulu, HI.
- Member of the Graduate Affair Committee – Geology and Geophysics/University of Utah
- Alternate elector for the Consortium for Materials Properties Research in Earth Sciences
- Judge at the Undergraduate Research Symposium at University of Utah
- Panelist and reviewer for several NSF EAR funding programs
- Reviewer for the Energy and Environment Program at the Alfred P. Sloan Foundation
- Member of the Editorial Board of Petrology as Review Editor for Frontiers in Earth Science
- Reviewer for several international journals: https://publons.com/researcher/1226056/sarah-lambart/
- Inventory and update of the thin section teaching collection at University of Utah
- Volunteer for the department Open House: supervise the “petrology” table.
- Member of the organization committee of @MineralCup

Past

- Convener and chair of the session 06a «Mantle2Crust: Basalt genesis, transport and differentiation», Goldschmidt, Barcelona, SP
- Member of the search committee for a new faculty position in Geodesy (2018-2019)
- In charge of the organization of the Distinguished Lecture Series at University of Utah (Fall 2018)
- Seminar organization: in charge of the Solid Earth brownbag seminars at Cardiff University (2017)
- In charge of the experimental lab at UC Davis (2015-16)
- Member of the Volcanology-Geochemistry-Petrology (VGP) student awards committee (2014-16)
- Primary advisor of a geoscience education project: "Building" 3D visualization skills in mineralogy. (2016)
- Co-Convener of the session 04f «Mantle Melting in Earth and Planetary Interiors», Goldschmidt, Yokohama, JP. (2016)
- Primary Convener and chair of session #7653 “The origin of basalt magmatism”, AGU Fall Meeting, San Francisco, CA, Dec. (2015)
- Open houses: in charge of the “Petrology and Mineralogy” stand for the UC Davis Picnic Day (2016) and development of the activity “chemistry can break rocks!” at the LDEO Open House (2014)
- Postdoc representative for the Campus Life Committee at LDEO (2014-15)
- OSPA Judge (Outstanding Student Paper Awards) at the AGU Fall Meetings (2011-12)
- PhD student delegate at the OPGC (Observatoire de Physique du Globe de Clermont-Ferrand) scientific council (2007-09)

- Seminar organization: In charge of internal seminars of the experimental petrology division (X-pots) of the Laboratoire Magmas and Volcans (2007-09)

Professional memberships

AGU; EAG; NAGT; MSA; COMPRES

International publications:

Summary: 13 papers published, total citations 417, h = 8, *students, [+]media coverage

[13] Mallik A., **Lamba**rt **S.,** Chin E., (under review) Tracking the evolution of magmas from heterogeneous mantle sources to eruption. In: Konter J., Ballmer M, Cottaar S, & Marquardt H. (Eds.), Mantle Convection and Surface Expressions. *AGU monograph,* **invited contribution.** (equally contributing authors)

[12[+]] **Lambart S.,** Koornneef J.M., Millet M.-A., Davies G., Cook* M., Lissenberg C.J. (2019) A Highly Heterogeneous Depleted Mantle Recorded in the Lower Oceanic Crust. *Nature Geoscience*, 12: 482-486. doi: 10.1038/s41561-019-0368-9

[11] Elkins L.J., Bourdon B., **Lambart S**. (2019) Testing pyroxenite vs. peridotite sources for marine basalts using U-series isotopes. *Lithos*, **invited review**, 332-333: 226-244, doi: 10.1016/j.lithos.2019.02.011

[10] **Lambart S.,** Savage H.M., Robinson* B., Kelemen P.B. (2018) Experimental investigation of the pressure of crystallization of $Ca(OH)_2$: implications for the reactive-cracking process. *Geochemistry, Geophysics, Geosystems*. doi: 10.1029/2018GC007609.

[9] Kelemen et al. (2018) In situ carbon mineralization in ultramafic rocks: Natural processes and possible engineered methods. *Energy Procedia – Special issue: International Carbon Conference*, 146: 92-102. doi: 10.1016/j.egypro.2018.07.013.

[8] **Lambart S.** (2017) No direct contribution of recycled crust in Icelandic basalts*. Geochemical Perspectives Letters*, 4: 7-12. doi: 10.7185/geochemlet.1728

[7[+]] **Lambart S.**, Baker M.B., Stolper E.M (2016) Role of pyroxenite in basalt genesis: Melt-PX, a melting parameterization for mantle pyroxenites at 0.9-5 GPa. *Journal of Geophysical Research – Solid Earth,* 121. doi: 10.1002/2015JB012762.

[6] Laporte D., **Lambart S.**, Schiano P., Ottolini L. (2014) Experimental derivation of nepheline syenite and phonolite liquids by partial melting of upper mantle peridotites. *Earth and Planetary Science Letters*, 404:319-331. doi: 10.1016/j.epsl.2014.08.002.

[5] Shortlle O., Maclennan J., **Lambart S.** (2014), Quantifying lithological variability in the mantle. *Earth and Planetary Sciences Letter,* 395(1):24-40. doi: 10.1016/j.epsl.2014.03.040.

[4] **Lambart S.**, Laporte D., Schiano P. (2013), Markers of the pyroxenite contribution on the major-element compositions of oceanic basalts: review of the experimental constraints. *Lithos*, **Invited Review**, 160: 14-36, doi:10.1016/j.lithos.2012.11.018.

[3] **Lambart S.**, Laporte, D., Provost A., Schiano, P. (2012), Fate of pyroxenite-derived melts in the peridotitic mantle: Thermodynamic and experimental constraints. *Journal of Petrology,* 53(3): 451-476*.* doi: 10.1093/petrology/egr068.

[2] **Lambart S.**, Laporte, D., Schiano, P. (2009), An experimental study of pyroxenite partial melts at 1 and 1.5 GPa: Implications for the major-element composition of Mid-Ocean Ridge Basalts. *Earth and Planetary Science Letters*, 288: 335-347. doi: 10.1016/j.epsl.2009.09.038.

[1] **Lambart S.**, Laporte, D., Schiano, P. (2009), An experimental study of focused magma transport and basalt-peridotite interactions beneath mid-ocean ridges: implications for the generation of primitive MORB

compositions. *Contributions to Mineralogy and Petrology*, 157: 429-451. doi 10.1007/s00410-008-0344-7.

Other publications

[3] **Lambart S.** (2010) "Role of mantle heterogeneities in MORB genesis: Experimental study of the partial melting of pyroxenites and of the magma/rock interaction at high pressure", Ph.D thesis, Département des Sciences de la Terre, Université Blaise Pascal, Clermont-Ferrand, France, January 8th 2010, pp. 286.

[2] **Lambart S.** (2006) "Experimental approach on the role of focused magma transport beneath mid-ocean ridge: implications for MORB genesis", Master thesis, Département des Sciences de la Terre, Université Blaise Pascal, Clermont-Ferrand, France, pp. 51.

[1] **Lambart S.** (2005) "Kinetics of growth and dissolution of diopside in silicate bath", Master thesis, Département des Sciences de la Terre, Université Blaise Pascal, Clermont-Ferrand, France, pp. 21.

Published abstract since 2010 (* denote the speaker, $^{+}$student)

[22] *Lissenberg C.J., MacLeod C.J., Bennett E.N., Loocke M., Yang A.Y., **Lambart, S.** Magma processing in the lower oceanic crust. VMSG, Plymouth, UK, Jan. **2020**. **Keynote talk**

[21] ***Lambart S.,** Koornneef J.M., Millet M.-A., Davies G., $^{+}$Cook M., Lissenberg C.J. Centimeter-scale isotopic heterogeneity preserved in the lower oceanic crust. AGU FM, San Francisco, Calif., Dec. **2019**. **Invited talk**

[20] ***Lambart S.,** Koornneef J.M., Millet M.-A., Davies G., $^{+}$Cook M., Lissenberg C.J. Mantle heterogeneity preserved in the lower oceanic crust. Goldschmidt 2019, Barcelona, Spain, Aug. **2019. Talk**

[19] *Mallik A., **Lambart S.**, Chin E., Constraining heterogeneity in the upper mantle using Ocean Island Basalts. Goldschmidt 2019, Barcelona, Spain, August **2019. Invited talk**

[18] $^{+}$*Haddick W., **Lambart S.** Investigating Melt-Rock Interactions in Gabbroic Rocks from the Atlantis Massif: Implications for Oceanic Crustal Accretion. NCUR 2019, Kennesaw, GA, Apr. **2019. Poster**

[17] ***Lambart S.,** Koornneef J.M., Millet M.-A., Davies G., $^{+}$Cook M., Lissenberg C.J. Mantle heterogeneity revealed in the Lower Oceanic Crust. AGU FM, Washington DC, Dec. **2018. Talk**

[16] *Elkins L. J., Bourdon B., **Lambart S.**, The effects of two-lithology mantle melting on U-series in basalts. Goldschmidt, Boston, USA, August **2018. Talk**

[15] ***Lambart S.,** Batch vs Continuous Melting: Importance of the Melting Regime in Quantifying the Mantle Heterogeneity. Goldschmidt, Paris, France, August **2017. Invited talk**

[14] *Skarbek R. M., Savage H. M., Kelemen P. B., **Lambart S.,** Robinson B., Experiments on the effects of confining pressure during reaction-driven cracking. AGU FM, San Francisco, Calif., Dec. **2016. Poster**

[13] Gaudio S. J., $^{+}$*Ajoku C., $^{+}$Mccarty B., **Lambart S.** "Building" 3D visualization skills in mineralogy. AGU FM, San Francisco, Calif., Dec. **2016. Poster**

[12] ***Lambart S.**, Quantifying Mantle Heterogeneity beneath Iceland: Melting Process and Buoyancy. Goldschmidt, Yokohama, Japan, June **2016. Talk**

[11] ***Lambart S.**, The importance of the melting process for quantifying mantle heterogeneity. AGU, San Francisco, Calif., Dec. **2015. Poster**

[10] ***Lambart S.**, Melt-rock interactions: infinite source of new mantle lithologies. GSA meeting, Baltimore, Maryland, Nov. **2015**. **Invited talk**

[9] **Lambart S.**, Savage H.M., *Kelemen P.B., Experimental investigation of the pressure of crystallization of

$Ca(OH)_2$: implication for the reactive-cracking process. 5th ACEME, New York, New york, June **2015**. **Keynote presentation**

[8] ***Lambart S.**, Kelemen P.B. A coupled geochemical and geodynamical approach for mantle melting beneath Hawaii, AGU, San Francisco, Calif., #V33C-4885, Dec. **2014**. **Poster**

[7] Savage H., ***Lambart S.**, Kelemen P.B., Koczynski T.A., Experimental investigation of the pressure of crystallization, AGU, San Francisco, Calif., #V23A-4768, Dec. **2014**. **Poster**

[6] ***Lambart S.**, Baker M.B., Stolper E.M. PX-MELT: a predictive model for the melting of pyroxenites in the mantle, 6th International Orogenic Lherzolite Conference, Marrakech, Morocco, May **2014. Talk**

[5] *Shortlle O., **Lambart S.**, Maclennan J. Quantifying the lithological and thermal properties of the mantle using basalt chemistry, AGU, San Francisco, Calif., #DI21A-2246, Dec. **2013**. **Poster**

[4] *Shortlle O., **Lambart S.**, Maclennan J. Constraining the amount of recycled material in the mantle source from basalt chemistry. EGU, Vienne, Austria, #EGU2013-8312-2, Apr. **2013**. **Invited talk**

[3] ***Lambart S.**, Baker M.B., Stolper E.M. Parameterizing *P-T-F* relationships for mantle pyroxenites at 0.9–5 GPa, Fall Meeting, AGU, San Francisco, Calif., #DI51A-2343, Dec. **2012. Poster**

[2] ***Lambart S.**, Baker M.B., Stolper E.M. Parameterizing near-solidus temperatures of mantle pyroxenites and eclogites, Fall Meeting, AGU, San Francisco, Calif., #V32B-04, Dec. **2011**. **Talk**

[1] ***Lambart S.**, Laporte D., Schiano P., Provost A. Mantle pyroxenites as source of the compositional variability in alkali basalts?, AGU, San Franciso, Calif., #V13F-01, Dec. **2010**. **Invited talk**

Selected media coverage and highlights:

2019 – UNews: How Earth's mantle is like a Jackson Pollock
https://unews.utah.edu/mantle/
EGU Blog: Are mantle melts heterogeneous on a centimeter scale?
https://blogs.egu.eu/divisions/gmpv/2019/07/18/heterogeneity/
NSF news: Earth's mantle looks like a painting
https://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=298587
NPR: http://www.tinyurl.com/y4bf9xv3

2016 - Editor's highlights in Journal of Geophysical Research:
https://agupubs.onlinelibrary.wiley.com/article/10.1002/2015JB012762/editor-highlight/10.5555/MIG-HO.6f59621a-59e1-40bb-b79a-3b2aa2981905
Eos Research Spotlights: A Better Model for How the Mantle Melts
https://eos.org/research-spotlights/a-better-model-for-how-the-mantle-melts

Collaborators – Present and past (alphabetical order):

Mike Baker (Caltech), Eric Brown (Aahrus University), Emily Chin (SCRIPPS), Lynne Elkins (University of Nebraska-Lincoln), Sarah Gaudio (SUNY Geneseo), Peter Kelemen (Columbia University), Janne Koornneef (V.U. Amsterdam), Didier Laporte (Blaise Pascal University), Chip Lesher (UC Davis), Johan Lissenberg (Cardiff University), John Maclennan (Cambridge U.), Ananya Mallik (Brown University), Marc-Alban Millet (Cardiff University), Ariel Provost (Blaise Pascal University), Heather Savage (LDEO), Pierre Schiano (Blaise Pascal University), Oliver Shorttle (Cambridge U.), Ed Stolper (Caltech), Rong Xu (China University of Geosciences, Wuhan).

Last update: December 10th, 2019