

Sarah Lambart

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Academic appointments

Assistant Professor in Igneous Processes

University of Utah - Department of Geology and Geophysics

Since March 2018

MSCA-COFUND Fellow

Cardiff University - School of Earth and Ocean Sciences

Jan. 2017 - Jan. 2018

Visiting Assistant Professor

University of California Davis - Department of Earth and Planetary Sciences

Jul. 2015 - Dec. 2016

Lamont Postdoctoral Fellow

Columbia University - Lamont-Doherty Earth Observatory

Sep. 2013 - Jun. 2015

Postdoctoral Scholar

Caltech - Division of Geological and Planetary Sciences

Sep. 2010 - Aug. 2013

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
- Mineral carbon sequestration

Key skills:

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

Grants and fellowships

- “Development of an experimental technique to study magma migration” (**Lead PI**, CMES Seed grant, 01/01/19-12/31/2019, \$22k) – **pending**
- “High temperature experiments for pore-scale investigation of a two fluid phase migration in porous media” (**Lead PI**, American Chemical Society – DNI Grant: 09/01/19-08/31/2021, \$110k) – **pending**
- “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:

- 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 Aarhus 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 and training: (IR= instructor of record; TA=teaching assistant)

Year	IR/TA	Course	Level/year	Institutions	# students
2019	IR	GEO 3050 Petrology	Undergrad. 2-4	U. of Utah	15
2018	IR	GEO 4100 Mineralogy	Undergrad. 1-4	U. of Utah	12
2017	co-IR	Earth Materials	Undergrad. 1	Cardiff U.	60
2016	IR	Mineralogy	Undergrad. 1-2	UC Davis	38
	co-IR	The Earth	Undergrad. 0-1	UC Davis	21
	IR	Igneous Petrology	Undergrad. 3-4	UC Davis	25
2015	IR	Optical Mineralogy	Undergrad. 2-3	UC Davis	22
	IR	Mineralogy	Undergrad. 1-2	UC Davis	28
2013	co-IR	Advanced petrology	Graduate 1-3	Columbia U.	8
2009	TA	Cartography 101	Undergrad. 1	Blaise Pascal U.	15
2006-09	co-IR	Mathematics	Undergrad. 1	Blaise Pascal U.	30
	TA	Volcanic cartography	Graduate 1	Blaise Pascal U.	30

Mentored Students:

- Valérie Payré (Master student; co-supervised with Ed Stolper; Caltech 03/2013-08/2013)
- Ben Robinson (Research assistant; LDEO, summer 2016)

- Cecilia Ajoku and Bryan Mccarty (senior undergrads; UC Davis summer & fall 2016)
- Paul Edwards (Master student; co-supervised with Chip Leshner; UC Davis 09/2016-09-2018)
- Matthew Cook (MESci student; Cardiff University; summer 2017)
- William Haddick (UROP Scholar; University of Utah; fall 2018 & Spring 2019)
- Ongoing search (Graduate student; University of Utah; start in fall 2019)

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)

Professional development

- 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 – seismometer retrieval and field trip (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

- Co-Convener of the session 06a «Mantle2Crust: Basalt genesis, transport and differentiation», Goldschmidt, Barcelona, SP (2019)
- In charge of the organization of the Distinguished Lecture Series at University of Utah (Fall 2018)
- Reviewer for NSF EAR and NSF GeoPRISMS funding programs (2013-)
- Reviewer for several international journals: Nature Geoscience, Science Advances, Geology, J. Petrol., Chemical Geology, EPSL, Lithos, GCA, Contrib. Mineral. petrol., American Journal of Science (2009-)
- 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. Selection of the Outstanding Student Paper Awards for VGP at the AGU conferences. (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)
- Seminar organization. In charge of the "fluid-rock deformations" seminar at LDEO - weekly reading groups and discussions (2014)
- 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

European Association of Geochemistry; IAVCEI; NAGT; Association for Women Geoscientists

International publications:

Summary: 10 papers published, 3 submitted, 1 in preparation, total citations 325, h = 7, *students

[13] Mallik A., **Lambart S.**, Chin E., 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. *Under review in AGU monograph, invited contribution.*

[12] Elkins L.J., Bourdon B., **Lambart S.**, Testing pyroxenite vs. peridotite sources for marine basalts using U-series isotopes. *Under review in Lithos, invited review.*

[11] **Lambart S.**, Koornneef J.M., Millet M.-A., Davies G., Cook* M., Lissenberg C.J. A Highly Heterogeneous Depleted Mantle Recorded in the Lower Oceanic Crust. *Under review in Nature Geosciences.*

[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. **Selected for AGU Research Spotlight and Editor's Highlights.**

[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] Shorttle 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.

In preparation:

[14] **Lambart S.**, The importance of the melting process for quantifying mantle heterogeneity.

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)

[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. Submitted for

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 $\text{Ca}(\text{OH})_2$: 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] *Shorttle 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] *Shorttle 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 Francisco, Calif., #V13F-01, Dec. **2010. Invited talk**

Collaborators – Present and past (alphabetical order):

Mike Baker (Caltech), Eric Brown (Aarhus University), 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 Leshner (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).

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