

CURRICULUM VITAE

Alberto E. Saal

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1. Home Address

64 Southbourne Road, Boston, MA 02130

2. Education

- 2000 Ph.D. Massachusetts Institute of Technology/Woods Hole Oceanographic Institution Joint Program.
Oceanography/Geochemistry
1994 M.Sc. Massachusetts Institute of Technology. Geochemistry
1993 Ph.D. Universidad Nacional de Cordoba, Argentina. Geological Sciences, summa cum laude.
1985 B.Sc. Universidad Nacional de Cordoba, Argentina. Geological Sciences

3. Professional Appointments

- 2016-present Professor, Department of Earth, Environmental and Planetary Sciences, Brown University
2016-2017 Visiting Professor, Institut de Physique du Globe de Paris, France.
2009-2016 Associate Professor, Department of Earth, Environmental and Planetary Sciences, Brown University
2003-2009 Assistant Professor, Department of Earth, Environmental and Planetary Sciences, Brown University.
2009-present Visiting Investigator, Department of Terrestrial Magnetism, Carnegie Institution of Washington.
2006 summer Visiting Professor, Institut de Physique du Globe de Paris, France.
2002 summer Visiting Professor, Institut de Physique du Globe de Paris, France.
2001-2002 Associate Research Scientists, Lamont Doherty Earth Observatory, Columbia University.
2001-2002 Storke-Doherty Lecturer, Department of Earth and Environmental Sciences, Columbia University
1999-2001 NSF-RIDGE Postdoctoral Fellow NSF-Ocean Sciences.
1999-2001 Postdoctoral Fellow, Lamont Doherty Earth Observatory, Columbia University

4. Complete Publications:

Refereed Publications († denotes Saal's student or postdoc):

†D.W. Anderson, **A.E. Saal**, J.I. Lee et al., Tracing mantle components and the effect of subduction processes beneath the northern Antarctic Peninsula (2022), *Geochimica et Cosmochimica Acta*. doi.org/10.1016/j.gca.2022.11.018

†K. Shimizu, **A.E. Saal**, E.H. Hauri et al., High-C content and CO₂/Ba ratio of the Earth's enriched upper mantle (2022), *Geochimica et Cosmochimica Acta*, <https://doi.org/10.1016/j.gca.2022.10.023>

†Parks, B., Calabozo, F., **Saal, A. E.**, Wang, Z., Mallick, S., Petrinovic, I., Frey, F.A (2022) Unraveling the signature of metasomatized subcontinental lithospheric mantle in the basaltic magmatism of the Payenia volcanic province, Argentina. *Geochemistry, Geophysics and Geosystems* <https://doi.org/10.1029/2021GC010071>.

†Chin, E. J., †Chilson-Parks, B. H., Boneh, Y., Hirth, G., **Saal, A. E.**, Carter Hearn, B., Hauri, Erik, H. (2021) The peridotite deformation cycle in cratons and the deep impact of subduction. *Tectonophysics* 817, <https://doi.org/10.1016/j.tecto.2021.229029>

Boneh, Y., †Chin, E. J., †Chilson-Parks, B. H., **Saal, A. E.**, Hauri, E. H., Carter Hearn, B., Hirth, G. (2021) Microstructural shift due to post-deformation annealing in the upper mantle. *Geochemistry, Geophysics and Geosystems*. <https://doi.org/10.1029/2020GC009377>.

Saal A. E. and Hauri E. H., (2021) Large Sulfur Isotope Fractionation in Lunar Volcanic Glasses Reveals the Magmatic Differentiation and Degassing of the Moon. *Sciences Advances* 7, 9, <https://www.science.org/doi/10.1126/sciadv.abe4641>.

†Shimizu, K., **Saal, A. E.**, Hauri, E. H., Sinton, J. M., Janney, P. E., Geshi, N., Hékinian R. (2021) High C

concentration and CO₂/Ba ratio in Earth's enriched upper mantle. *Geochimica et Cosmochimica Acta* (submitted)

Head J. W., Wilson L., Deutsch A.N., Rutherford M. J., **Saal A. E.** (2020) Volcanically Induced Transient Atmospheres on the Moon: Assessment of Duration, Significance, and Contributions to Polar Volatile Traps. *Geophysical Research Letters* 47, 18 <https://doi.org/10.1029/2020GL089509>

DeFelice, C., Mallick, S., **Saal, A. E.**, Huang, S. (2019) A depleted lower mantle component is intrinsic to the Hawaiian mantle plume. *Nature Geoscience* <https://doi.org/10.1038/s41561-019-0348-0>.

†Peterson, M., Wang, Z., **Saal, A. E.**, Kurz, M., Eiler, J. (2019) Oxygen isotope compositions of lavas from the Galapagos Archipelago: geochemical contributions from modern crustal sources. *Contributions to Mineralogy and Petrology* 174:17

Yakovlev P.V., **Saal A.E.**, Clark M.K., Hong C., Niemi N. A., Mallick S. (2019) The Geochemistry of Tibetan Lavas: Spatial and Temporal Relationships, Tectonic Links and Geodynamic Implications. submitted to *Earth and Planetary Sciences*. *Earth and Planetary Science Letters* 520, 115–126.

†Shimizu, K., **Saal, A.E.**, Hauri, E., Perfit M.R. and Hekinian R. (2019), Evaluating the roles of melt-rock interaction and partial degassing on the CO₂/Ba ratios of MORBs: implications for the CO₂ budget in Earth's depleted upper mantle. *Geochimica et Cosmochimica Acta* 260, 29–48.

Hauri E. H., Cottrell E., Kelley K. A., Tucker J. M., †Shimizu K., Le Voyer M., Marske J., **Saal A.E.** (2019) Carbon in the Convecting Mantle in: Orcutt B, Daniel I, Dasgupta R, eds. *Deep Carbon: Past to Present*. Cambridge, UK: Cambridge University Press doi: 10.1017/9781108677950.

Füri E., Zimmermann L., Saal A.E. (2018) Apollo 15 green glass He-Ne-Ar signatures – In search for indigenous lunar noble gases. *Geochemical perspective Letters* doi: 10.7185/geochemlet.1819

Hauri E.H., **Saal, A. E.**, Nakajima, M., Anand, M., Rutherford, M.J., Van Orman J.A., LeVoyer M. (2017) Origin and Evolution of Water in the Moon's Interior. *Annual Review of Earth and Planetary Sciences*, 45, Issue 1, 89-111.

†Shimizu, K., Liang, Y., Sun, C., Jackson, C. R. M., **Saal, A. E.**, (2017) Parameterized lattice strain models for REE partitioning between amphibole and silicate melt. *American Mineralogist*, 102 (11): 2254-2267.

Rutherford, M. J., Head, J. W., **Saal, A. E.**, Wilson, L., Hauri, E. (2017) Model for the origin, ascent and eruption of lunar picritic magmas. *American Mineralogist*, 102 (10): 2045-2053.

†Peterson, M., **Saal, A. E.**, Kurz, M.D., Hauri, E.H., Blusztajn, J., Harpp, K.S., Werner, R., Geist, D.J., (2017) Submarine Basaltic Glasses from the Galapagos Archipelago: Determining the Volatile Budget of the Mantle Plume. *Journal of Petrology* 58, Issue 7, 1419–1450.

†Chin, E. J. Soustelle, V., Hirth, G., **Saal, A. E.**, Kruckenberg, S. C., Eiler, J. M. (2016) Microstructural and geochemical constraints on the evolution of deep arc lithosphere. *Geochemistry, Geophysics and Geosystems* Volume 17, Issue 7, Pages 2497–2521.

†Shimizu K., **Saal, A.E.**, †Myers, C.E., † Nagel, A.N.; Hauri, E.H., Forsyth, D.W., Kamenetsky, V.S., Niu, Y., - (2016) - Two-component mantle melting-mixing model for the generation of mid-ocean ridge basalts: Implications for the volatile content of the Pacific upper mantle. *Geochimica et Cosmochimica Acta* 176, 44–80.

†Wetzel D. T., Hauri E. H., **Saal A. E.**, Rutherford M. J., - (2015) - Carbon Content and degassing history of the lunar volcanic glasses. *Nature Geosciences* accepted for publication. *Nature Geoscience* 8, 755–758.

Hauri E.H., **Saal, A.E.**, Rutherford, M.C. & Van Orman J.A., - (2015) - Water in the Moon's interior: truth and consequences. Invited paper to *Frontiers in Earth and Planetary Sciences* 409, 252–264.

†Peterson, M., Saal A., Nakamura, E., Kitagawa, H., Kurz M. D., Koleszar A. M. - (2014) Origin of the “ghost plagioclase” signature in Galapagos melt inclusions: new evidence from lead isotopes. *Journal of Petrology* 55, 2193-2216.

Kurz, M.D., Rowland, S.K., Curtice, J., **Saal, A.E.**, Naumann, T. - (2014) - Eruption rates for Fernandina volcano: a new chronology at the Galápagos hotspot center. In *The Galapagos: A Natural Laboratory for the Earth Sciences* K.S. Harpp, E. Mittelstaedt, N. d'Ozouville, D.W. Graham (Editors). American Geophysical Union monograph, pp. 41-54.

- Newcombe M. E.; Fabbriozio A.; Zhang Y.; Ma C.; Le Voyer M.; Guan Y.; Eiler J. M.; **Saal A. E.**; Stolper E. M. (2014) Chemical Zonation in Olivine-Hosted Melt Inclusions. *Contribution to Mineralogy and Petrology*, 168 (1). Art. No. 1030. ISSN 0010-7999.
- Saal, A.E.**, Hauri, E.H., Van Orman, J., Rutherford, M. - (2013) - Hydrogen Isotopes in Lunar Volcanic Glasses and Melt Inclusions: a Carbonaceous Chondrite Heritage Revealed. *Science* 340, 1317-1320.
- †Wetzel D. T., Rutherford M. J., Jacobsen S. D., Hauri E. H., **Saal A. E.** (2013) Degassing of Reduced Carbon from Planetary Basalts. *Proc. Natl. Acad. Sci.*, 110, pp. 8010–8013.
- Handley, H. K., Turner, S., Berlo, K., Beier, C. and **Saal, A. E.** - (2011),- Insights into the Galápagos plume from uranium-series isotopes of recently erupted basalts, *Geochem. Geophys. Geosyst.*, 12, Q0AC14, doi:10.1029/2011GC003676.
- Hauri E.H., † Weinreich, T., **Saal, A.E.**, Rutherford, M.C. & Van Orman J.A., - (2011) - High pre-eruptive water contents preserved in lunar melt inclusions. *Science*, 333, 213-215
- Van Orman, J.A. and **Saal, A.E.** - (2010) - Diffusion constraints on rates of melt production in the mantle, in “Timescales of Magmatic Processes: From Core to Atmosphere”, A. Dosseto, S.P Turner, J.A. Van Orman, Eds., Wiley-Blackwell, p. 52-67.
- Van Orman, J.A. and **Saal, A.E.** - (2009) - Crustal control on ²¹⁰Pb disequilibria in basalts. *Earth and Planetary Science Letters*, 284, 3-4, 284-291.
- †Koleszar, A.M., **Saal, A.E.**, Hauri, E.H., Nagle, A.N., Liang, Y. and Kurz, M.D. - (2009) - The volatile contents of the Galapagos plume; evidence for H₂O and F open system behavior in melt inclusions. *Earth and Planetary Science Letters*, 287, 3-4, 442-452.
- Pickle, R.C., Forsyth, D.W., Harmon, N., Nagle, A.N. and **Saal A.E.** - (2008) - Thermo-mechanical control of axial topography of intra-transform spreading centers. *Earth and Planetary Science Letters*, 284, 3-4, 343-351.
- Jackson, M.G., Hart, S.R., **Saal, A.E.**, Shimizu, N., Kurz, M. D., Blusztajn, J. S. and Skovgaard, A.C., - (2008) - Globally elevated titanium, tantalum, and niobium (TITAN) in ocean island basalts with high ³He/⁴He. *Geochemistry, Geophysics and Geosystems*, 9 (4) doi:10.1029/2007GC001876.
- Saal, A.E.**, Hauri, E.H., Lo Cascio, M., Van Orman, J.A., Rutherford, M.J. and Cooper, R.F. - (2008) - The Volatile Content of the Lunar Volcanic Glasses: Evidence for the Presence of Water in the Moon’s Interior. *Nature* 454, 192-195.
- Saal, A.E.**, Kurz, M.D., Hart, S.R., Busztajn, J., Blichert-Toft, J., Liang, Y. and Geist, D. - (2007) - The role of lithospheric gabbros on the composition of Galapagos Lavas. *Earth and Planetary Science Letters* 257, 391-406. [2]
- Bourdon, B., Ribe, N.M., Stracke, A., **Saal, A.E.** and Turner, S.P. - (2007) - Reply to “Evidence for mantle plumes? by D.L. Anderson and J.H. Natland. Brief communication arising from Bourdon et al. *Nature* 444, 713-717”. *Nature* 450, 11-22-07.
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- Van Orman, J.A., **Saal, A.E.**, Bourdon, B. and Hauri, E.H. - (2006) - Diffusive fractionation of U-series nuclides during mantle melting and shallow level melt-cumulate interaction. *Geochimica et Cosmochimica Acta* 70, 4797-4812.
- Saal, A.E.**, Hart, S.R., Shimizu, N., Hauri, E.H., Layne, G.D. and Eiler, J.M. - (2005) - Pb isotopic variability in melt inclusions from the EMI-EMII-HIMU end members and the role of the oceanic lithosphere. *Earth and Planetary Science Letters* 240, 605-620.
- Saal, A.E.**, Hauri, E.H., Langmuir, C.H. and Perfit, M.R. - (2004)- Reply to “The role of *f*O₂ in fluid saturation of oceanic basalt by B. Scaillet and M. Pichavant. Brief communication arising from A.E. Saal et al. *Nature* vol. 419, 451-455”. *Nature* 430, 7-29-04.
- Saal, A.E.** and Van Orman, J.A. - (2004) - The ²²⁶Ra enrichment in oceanic basalts: evidence for melt-cumulate diffusive interaction processes within the oceanic lithosphere. *Geochemistry, Geophysics and Geosystems* vol 5 (2) 2003GC000620.

Saal, A.E., Hauri, E.H., Langmuir, C.H. and Perfit, M.R. - (2002) - Vapor undersaturation in primitive mid-ocean ridge basalt and the volatile content of the Earth's Upper Mantle. *Nature* 419, 451-455.

Saal, A.E., Takazawa, E., Frey, F.A., Shimizu, N. and Hart, S.R. - (2001) - Re-Os isotopes in the Horoman peridotite: Evidence for refertilization? *Journal of Petrology* 42, (1), 25-37.

Hart, S.R., Staudigel, H., Koppers, A.A.P., Blusztajn, J., Baker, E.T., Workman, R., Jackson, M., Hauri, E., Kurz, M., Sims, K., Fornari, D., **Saal, A.E.** and Lyons, S. - (2000) - Vailulu'u Undersea Volcano: The New Samoa, *Geochemistry, Geophysics and Geosystems* GC000108, 1-13.

Takazawa, E., Frey, F.A., Shimizu, N., **Saal, A.E.** and Obata, M. - (1999) - Polybaric petrogenesis of mafic layers in the Horoman peridotite complex, Japan. *Journal of Petrology*, 40, (12), 1827-1851.

Saal, A.E., Hart, S.R., Shimizu, N., Hauri, E.H. and Layne, G.D. - (1998) - Pb isotopic variability in melt inclusions from oceanic island basalts, Polynesia. *Science* 282, 1481-1484.

Saal, A.E., Rudnick, R.L., Ravizza, G.E. and Hart, S.R. - (1998) - Re-Os isotope evidence for the composition, formation and age of the lower continental crust. *Nature* 393, 58-61.

Saal, A.E., Toselli, A. y Rossi de Toselli, J. - (1996) - Granitoides y rocas basicas de la Sierra de Paganzo. In "Geologia del Sistema de Famatina", Aceñolaza G.; Miller H. and Toselli A. (Eds). *Münchener Geologische Hefte* A19, 199-210.

Martino, R.D., Escayola, M. y **Saal, A.E.** - (1994) - Estructura del cuerpo de Kinzigita del Río Santa Rosa, Departamento Calamuchita. Provincia de Córdoba. *Revista de la Asociación Geológica Argentina*. 49, (1-2), 3-10.

Bermudez, A., Delpino, D., Frey, F.A. y **Saal, A.E.** - (1993) - Los basaltos de retroarco extraandino. *Relatorio del XII Congreso Geologico Argentino I*, (13), 161-172.

Saal, A.E. - (1988) - Los granitoides de la Sierra de Paganzo, La Rioja, Argentina. *V Congreso Geologico Chileno III*, I, 1 - 15.

Manuscript submitted, under revisions or to be submitted (available if requested)

†Shimizu, K., **Saal, A. E.**, (2022) The role of the metasomatized oceanic lithosphere on the composition of mid-ocean ridge basalts from the East Pacific Rise. Submitted to *Geochemistry, Geophysics and Geosystems*. Under revisions after reviews.

†Peterson, M., Kelley, K. A., Cottrell, E., **Saal, A. E.**, Kurz, M. (2022) The oxidation state of Fe in glasses from the Galapagos Archipelago: variable oxygen fugacity as a function of mantle source. To be submitted.

K. Durkin, P. R. Castillo, S. M. Straub, S. Mallick, **A.E. Saal**, J. K. Muller (2022) Widespread contamination of the Pacific upper mantle during the mid-Cretaceous. Submitted to *Geoscience Frontiers*. In review and revision.

C. J. Renggli, E.E. Steenstra, A.E. Saal (2022) "Sulfur in Mercury and Moon" chapter in the book "The Role of Sulfur in Planetary Processes: from Cores to Atmospheres" (Daniel Harlov and Gleb Pokrovski Editors) Springer. Under review.

Published Presentation Abstracts since 2010 (* denotes Saal as speaker; † denotes Saal's student, postdoc or Researcher in Saal's group speaker):

†Anderson DW, **AE Saal** (2022) Identifying the source of alkaline volcanism across the northern Antarctic Peninsula. Abstract Goldschmidt, Hawaii, US.

†Chin, E. J., †Chilson-Parks, B. H., Boneh, Y., Hirth, G., **Saal, A. E.**, Carter Hearn, B., Hauri, Erik, H. (2021) The peridotite deformation cycle and the deep impact of subduction beneath the Wyoming Craton. Abstract Goldschmidt Conference, Lyon, France.

Genot, I., †Mallick, S., Labidi, J., Saal, A. E., Cartigny, P. (2021) No recycled sulfur in south-american subduction components: evidence from South Chile ridge basalts. Abstract AGU fall meeting DI45B-0014.

Boneh, Y., †Chin, E. J., †Chilson-Parks, B. H., Saal, A. E., Hirth, G., (2021) Rapid deformation and annealing events recorded in a mantle xenolith from the Wyoming craton; A pathway for understanding microstructure evolution in the mantle. Abstract AGU fall meeting MR45B-0104.

- †Anderson, D.W., **Saal, A.E.**, Riley, T.R., Keller, R.A., Haase K.M., †Mallick, S., Wang, J. (2021) Source variations in volatile contents between Bransfield Strait and Phoenix Ridge, Antarctica. Abstract Goldschmidt Conference, Lyon, France.
- ***Saal A.E.**, Hauri, E.H. (2021) Large sulfur isotope fractionation in lunar volcanic glasses reveals the magmatic differentiation and degassing of the Moon. Abstract Goldschmidt Conference, Lyon, France.
- †Mallick, S., †Kuhl, S., **Saal A.E.**, Klein, E., Bach, W., Monteleone, B. (2021) Volatiles in the Chile Ridge Basalts and the Role of Adjacent Andean Subduction Zone. Abstract Goldschmidt Conference, Lyon, France.
- ***Saal A. E.**, Yakovlev P., Clark M., Hong C., Niemi N. and †Mallick S. (2020) The Geochemistry of Tibetan Lavas: Geodynamic Implications. Abstract Goldschmidt Conference Hawaii, USA.
- ***Saal A. E.**, Hauri E. H., Van Orman J. and Rutherford M. (2020) Magmatic Degassing and the Volatile Budget of the Moon, Contributions by Malcolm J. Rutherford. Abstract Goldschmidt Conference Hawaii, USA.
- †Anderson D.W., **Saal A.E.**, Riley TR, Keller R.A., Haase K.M., †Mallick S, Wang J. and Boesenberg J.S. (2020) Source Variations in Bransfield Strait and Relation to Nearby Phoenix Ridge. Abstract Goldschmidt Conference Hawaii, USA.
- González C, Hauri E, **Saal AE**, Wang J & Aguilera F (2019) A Preliminary Evaluation of Volatiles Content in Melt Inclusion in Monogenetic Centers of the Central Andean Volcanic Zone (Northern of Chile). Abstract Goldschmidt Conference Barcelona, Spain.
- Cottrell E, Kelley K, Tucker J, †Shimizu K, Le Voyer M, **Saal AE** & Hauri E (2019) Carbon in the Convecting Mantle: Erik Hauri's Legacy. Abstract Goldschmidt Conference Barcelona, Spain.
- Huang S, DeFelice C, †Mallick S & **Saal AE** (2019) Long Geochemical Streaks in the Hawaiian Plume. Abstract Goldschmidt Conference Barcelona, Spain.
- †Chilson-Parks B, †Calabozo F, **Saal AE**, Hauri E & †Mallick S (2019) Olivine-Hosted Melt Inclusions from the Andean Back Arc (34°-38°S). Abstract Goldschmidt Conference Barcelona, Spain.
- Florez D., Huber C. Milliken R., **Saal AE** (2019) The abundance of water in the lunar mantle: constraints from modeling, remote sensing, and laboratory data. Abstract AGU fall meeting V51I-0184.
- DeFelice, C., †Mallick, S., **Saal, A. E.**, Huang, S. (2019) An Isotopically Depleted Component Intrinsic to the Hawaiian Mantle Plume. Abstract AGU fall meeting V52A-08
- Cottrell E, Kelley K, Tucker J, †Shimizu K, Hauri E, Le Voyer M, **Saal AE** & (2019) Carbon in the Convecting Mantle. Abstract AGU fall meeting V24C-04
- Salazar A., Si W., Herbert T., Dalton C., **Saal AE.** (2019) Modeling the Role of Volcanism in the Past 20 Million Years of Global Cooling. Abstract AGU fall meeting PP14A-01
- Füri E., Zimmermann L., Deloule E. and **Saal A.E.**, (2019) The H-noble gas signature of single apollo volcanic glass beads. 50th Lunar and Planetary Science Meeting, Abstract [# 2132]
- ***Saal A.E.**, Chaussidon M, Gurenko A & Rutherford M (2018) Boron and Lithium Contents and Isotopic Composition of the Lunar Volcanic Glasses. 49th Lunar and Planetary Science Conference, Abstract #2575, Houston, USA
- †Chilson-Parks B, **Saal A.E.***, Wang Z, †Calabozo F, †Mallick S & Frey F (2018) The Payenia volcanic province, deciphering the role of the lithospheric mantle. AGU fall meeting V11A-08
- †Shimizu, K., **Saal, A.E.**, Hauri, E., Perfit M.R. and Hekinian R., (2018) Partial degassing and regassing of CO₂ in CO₂ undersaturated mid-ocean ridge basalts. AGU fall meeting, Abstract V52A-07.
- †Chilson-Parks B, Saal A.E., Wang Z, †Calabozo F, †Mallick S & Frey F (2018) Deciphering the geochemistry of lithospheric mantle in the melt source of the Payenia volcanic province, Argentina. Abstracts 419. Goldschmidt Conference, Boston, USA
- ***Saal A.E.**, Chaussidon M, Gurenko A & Rutherford M (2018) Lithium and Boron concentrations and isotopes of the lunar volcanic glasses Abstracts, 2207. Goldschmidt Conference, Boston, USA

- †Mallick S, **Saal A.E.**, Klein E & Bach W (2018) Hf-Nd isotopes of Chile Ridge Basalts, Evidence of Pelagic Sediment in the MORB mantle. Abstracts1663. Goldschmidt Conference, Boston, USA
- †Shimizu, K., **Saal, A.E.**, Hauri, E., Perfit M.R. and Hekinian R., (2018) The role of melt rock interaction on the CO₂/Ba ratio of depleted. Abstracts 2327. Goldschmidt Conference, Boston, USA
- Rutherford, M. J., Head, J. W., **Saal, A. E.**, Wilson, L., Hauri, E. (2017) A model for the ascent and eruption of lunar picritic magma based on experiments and lunar samples. 48th Lunar and Planetary Science Meeting Abstract.
- †Parks, B. H., Chin, E. J., Saal, A. E., Hirth, G., Hearn, C., Bodinier J.-L. (2017) Deciphering the composition and structure of Wyoming craton mantle lithosphere: insights from peridotite xenoliths. 11th International Kimberlite Conference Botswana, Africa.
- DeFelice, C., †Mallick, S., **Saal A. E.** and Huang S., (2017) Trace element evidence for a depleted component intrinsic to the Hawaiian plume. AGU fall meeting, Abstract DI51B-0305
- † Shimizu, K., Hauri, E., **Saal, A.E.**, Perfit M.R. and Hekinian R., (2017) Interaction of ultra-depleted MORBs with plagioclase: implications for CO₂/Ba ratios. AGU fall meeting, Abstract V33F-0577
- †Shimizu, K., **Saal, A. E.**, (2017) Volatiles in off-axial mid-ocean ridge basalts and the role of the metasomatized oceanic mantle lithosphere. AGU fall meeting, (Invited) Abstract V43G-01
- †Shimizu, K., Liang, Y., Sun, C., Jackson, C. R. M., Hauri, E. H., **Saal, A. E.**, (2017) Parameterized lattice strain models for HFSE and REE partitioning between amphibole and silicate melt (oral presentation). JpGU-AGU Joint Meeting 2017. Chiba, Japan.
- †Shimizu, K., **Saal, A. E.**, (2016) The role of the metasomatized oceanic lithosphere on the composition of mid-ocean ridge basalts from the East Pacific Rise. American Geophysical Union, Fall Meeting, Abstract [DI11A-2333].
- †Shimizu, K., Liang, Y., Sun, C., Jackson, C. R. M., **Saal, A. E.**, (2016) Parameterized Lattice Strain Models for REE Partitioning between Amphibole and Silicate Melt. Goldschmidt Conference, Yokohama, Japan.
- DeFelice, C., †Mallick, S., **Saal, A. E.**, Huang S. A. (2016) Depleted Component in Shield Lavas from Mauna Kea, Hawai'i. American Geophysical Union, Fall Meeting , Abstract [DI11A-2334].
- †Peterson, M., Kelley, K. A., Cottrell, E., **Saal, A.**, Kurz, M. (2015) The oxidation state of Fe in glasses from the Galapagos Archipelago: variable oxygen fugacity as a function of mantle source. American Geophysical Union, Fall Meeting Abstract [V23E-03].
- †Parks, B. H., †Chin, E. J., **Saal, A. E.**, Hirth, G., Hearn, C., (2015) Linking composition, deformation, and P-T conditions using peridotite xenoliths from the subcratonic mantle lithosphere, Wyoming Craton, Montana USA. American Geophysical Union, Fall Meeting, Abstract [T11B-2889].
- †Shimizu, K., Liang, Y., Sun, C., Jackson, C. R. M., **Saal, A. E.**, (2015) Parameterized Lattice Strain Models for REE Partitioning between Amphibole and Silicate Melt American Geophysical Union, Fall Meeting, Abstract [V13A-3091].
- †Chin, E. J., Lee, C.-T., Blichert-Toft, J., Soustelle, V., Hirth, G., **Saal, A. E.**, (2015) Constraints on arc tempos from the deep lithospheric record: P-T-X-t-deformation history of mantle xenoliths from the Sierra Nevada Batholith, California, USA", Gordon Research Conference: Interior of Earth.
- †Chin, E. J., Soustelle, V., Hirth, G., **Saal, A. E.**, Kruckenberg, S. C., Eiler, J. M. (2015) Thick, Cold and Dry Roots: the Key to Longevity of Continental Arc Lithosphere? American Geophysical Union, Fall Meeting, Abstract [T31F-2907]
- Rutherford M. J. Head J. W. III, **Saal A. E.**, Wilson L., Hauri E. (2015) A Revised Model for the Ascent and Eruption of Gas-Saturated Lunar Picritic Magma Based on Experiments and Lunar Sample Data. 46th Lunar and Planetary Science Meeting, Abstract [#1446]
- †Shimizu, K., **Saal, A.E.**, Hauri, E.H., Forsyth, D.W., Kamenetsky, V.S., Niu, Y.L. (2015) The Generation of MORB and the Volatile Contents of the Heterogeneous Upper Mantle. Gordon Research Conference: Interior of Earth.
- †Parks, B. Wang, Z. **Saal, A. E.**, Frey, F. A Blustajn J. (2015) Oxygen isotopes of intra-back arc lavas, Andean

Southern Volcanic Zone, 35 – 38°S: constraining the influence of shallow and deep processes in a continental arc setting. Gordon Research Conference: Interior of Earth.

LeVoyer M., Hauri E. H., **Saal A. E.**, (2015) Large Variations In The Volatile Content Of Olivine-Hosted Melt Inclusions From Lunar Magmas. 46th Lunar and Planetary Science Meeting Abstract [#2446]

Saal, A.E., J., Rutherford, Hauri, E.H. (2015) Magmatic Degassing and the Volatile Depletion of the Moon American Geophysical Union, Fall Meeting Invited Abstract [P44A-02]

Hauri E. H., **Saal A. E.**, Rutherford M. J., Van Orman J. A. (2015) Volatile Abundances in Apollo 12 Red Volcanic Glass. 46th Lunar and Planetary Science Meeting Abstract [#2454]

†Shimizu, K., **Saal, A.E.**, Hauri, E.H., Forsyth-D.W., Kamenetsky, V.S., Niu Y.L. (2014) Volatile element content of the heterogeneous upper mantle. AGU Fall Meeting. Abstract V53B-4843.

Portner, R., Dreyer, B., Clague D., Lowenstern, J., Head J., **Saal A.E.** (2014) Degassing history of a mid-ocean ridge rhyolite dome on the Alarcon Rise, Gulf of California. AGU Fall Meeting. Abstract V11C-4739.

Hauri E.H., **Saal A.E.** (2014) Variability of Water in the Convecting Mantle. AGU Fall Meeting. Invited Abstract V51E-03.

†Chin, E., Hirth, G., **Saal A.E.**, Eiler, J. (2014) Lattice-preferred Orientation and Volatile Content of Olivine in Arc Mantle Lithosphere, Based on Xenoliths from the Sierra Nevada Batholith, California. AGU Fall Meeting. Abstract T53E-08

†Wetzel D. T. Hauri E. H., **Saal A. E.**, Rutherford M. J. (2014) Dissolved Carbon Content of the Lunar Volcanic Glass Beads and Melt Inclusions: Carbon from the Lunar Interior. 45th Lunar and Planetary Science Meeting Abstract [#2238]

Hauri E. H., **Saal A. E.**, Rutherford M. J., Wetzel D. T. (2014) Volatile Content of Lunar Volcanic Glasses and the Volatile Depletion of the Moon. 45th Lunar and Planetary Science Meeting Abstract [#2628]

Saal, A.E., Hauri, E.H., Van Orman, J., Rutherford, (2013) M. Hydrogen Isotopes in Lunar Volcanic Glasses implications of their Terrestrial heritage. *Invited talk* at the Royal Society of London on the Origin of the Moon meeting.

Saal A, Hauri E, Van Orman J & Rutherford M (2013) δD in Lunar Volcanic Glasses and Melt Inclusions: A Carbonaceous Chondrite Heritage Revealed. Goldschmidt Conference, Florence, Italy. *Mineralogical Magazine*, 77(5) 2108.

†Wetzel DT, Rutherford, MJ, Jacobsen SD, Hauri, EH, **Saal, AE** & Thomas S-M (2013) Reduced C-O-H Volatiles Dissolved in Lunar Picritic Glasses. Goldschmidt Conference, Florence, Italy. *Mineralogical Magazine*, 77(5) 2484

†Peterson M, **Saal A**, Hauri E, Kurz M, Werner R, Hauff F, Geist D & Harpp K (2013) Volatile Budget of the Galapagos Plume. Goldschmidt Conference, Florence, Italy. *Mineralogical Magazine*, 77(5) 1956

†Shimizu K, **Saal A**, Hauri E, Kamenetsky V & Hékinian R (2013) Volatile Element Content of the Mid-Ocean Ridge Mantle. Goldschmidt Conference, Florence, Italy. *Mineralogical Magazine*, 77(5) 2199

†Parks B. H.; Wang Z.; **Saal A.E.**; Frey F. A.; Blusztajn J. (2013) Oxygen Isotopes in Intra-Back Arc Basalts from the Andean Southern Volcanic Zone. AGU Fall Meeting Abstract V51A-2640.

Newcombe M. E.; Fabbriozio A.; Zhang Y.; Ma C.; Le Voyer M.; Guan Y.; Eiler J. M.; **Saal A. E.**; Stolper E. M. (2013) Chemical zonation in olivine-hosted melt inclusions: A record of syn-eruptive cooling. AGU Fall Meeting Abstract Abstract V52B-07.

†Wetzel D. T., Jacobsen S. D., Thomas S.-M., Hauri E. H., Rutherford M. J., and **Saal A. E.** (2013) FTIR and Raman spectroscopy of the lunar picritic glasses. 44th Lunar and Planetary Science Meeting Abstract [#2360]

***Saal, A.E.**, Hauri, E.H., Van Orman, J., Rutherford, M. D/H ratios of lunar volcanic glasses. - (2012) - Planetary Origins and Frontiers of Exploration conference at Weizmann institute. Rehovot, Jerusalem.

***Saal, A.E.**, Hauri, E.H., Van Orman, J., Rutherford, M. - (2012) - D/H ratios of lunar volcanic glasses. 43rd Lunar and Planetary Science Meeting, Houston, Texas.

- † Wetzel, D.T., Hauri, E.H., **Saal, A. E.**, Van Orman, J., Rutherford, M.J. - (2012) - Pyroclastic Volcanism on the Moon and at Kilauea Iki; Similarities and Differences. AGU Chapman Conference on Hawaiian Volcanoes: From Source to Surface. Hawaii
- † Wetzel, D.T., Jacobsen, S.D., Rutherford, M.J., Hauri, E.H., **Saal, A. E.** - (2012) - The Solubility and Speciation of Carbon in Lunar Picritic Magmas. 43rd Lunar and Planetary Science Meeting, Houston, Texas.
- Costa, K., Parman, S.W., **Saal, A.E.**, Kelley, K.A., Shimizu, N., Nunes, J.C. , Rose-Koga, E.F. (2012) Volatile content and distribution in the Azorean mantle plume. Abstract V31D-2812 Fall Meeting, AGU.
- Rutherford, M.J., Wetzel, D.T., **Saal, A. E.**, Hauri, E.H.- (2012) - Experimental study of Gas Phase Formation and Evolution in Low fO₂ Planetary Basalts. (Invited) Abstract V13E-03. Fall Meeting, AGU.
- †Peterson, M., Saal A., Nakamura, E., Burgess, K., Kitagawa, H., - (2011) - Pb Isotopes and the Origin of the 'Ghost Plagioclase' Signature in Melt Inclusions from the Galapagos Archipelago. Abstract #1020. Goldschmidt Conference Prague, Czech Republic.
- †Peterson, M., Saal, A., Hauri, E., Kurz, M., Werner, R., Hauff, F., Geist, D., Harpp, K. - (2011) - Volatile budget of the mantle sources of the Galapagos plume. AGU Chapman Conference: Galapagos as a Laboratory for the Earth Sciences (abstract W-6). Galapagos, Ecuador
- Hauri E. H., †Weinreich T., **Saal A. E.**, Rutherford M. C., Van Orman J. A. (2011) Evidence for High Volatile Abundances in Lunar Melt Inclusions [#6036]. A Wet vs. Dry Moon: Exploring Volatile Reservoirs and Implications for the Evolution of the Moon and Future Exploration, Houston, Texas. *Invited Talk*
- Hauri E. H., †Weinreich T., **Saal A. E.**, Rutherford M. C., Van Orman J. A. (2011) High Pre-Eruptive Water Contents Preserved In Lunar Melt Inclusions. NASA Lunar Science Institute Forum 2011, Ames, California
- Handley H. Berlo K., Beier C., Turner S., **Saal A.E.** - (2011) - Insights into the Galápagos Plume from Uranium-Series Isotopes of Recently Erupted Basalts. Goldschmidt Conference, Prague, Czech Republic.
- Hauri E. H., **Saal A. E.**, Rutherford M. C., Van Orman J. A. - (2011) - The Volatile Content of Primitive Lunar Volcanic Glasses. Goldschmidt Conference, Prague, Czech Republic.
- ***Saal, A.E.**, Nagle, A., Pickle, R., Forsyth, D. (2011) Intra-Transform Magmatism; Melt Migration and Two-Component Mantle. Goldschmidt Conference, Prague, Czech Republic.
- Newcombe M., Fabbriozio A., Zhang Y., Guan Y., Ma C., Le Voyer M., Eiler J., Saal A.E., Stolper E. -(2011) - Volatile and Major Element Zonation within Melt Inclusions: A Natural Diffusion Experiment. Goldschmidt Conference, Prague, Czech Republic.
- ***Saal A. E.** , Hauri E. H., Van Orman J. A., Rutherford M. J., (2011) D/H Ratios of the Lunar Volcanic Glasses 2011 MR12A-04 Abstract Fall Meeting, AGU.
- Jeffcoat, C.R., Schwartz, J.J., Wooden, J.L., Mueller, P.A., **Saal, A.E.** (2011) U-Pb Zircon geochronology, Hf isotope and trace element geochemistry of a unique lower crustal - upper mantle section of a dying slow-spreading mid-ocean ridge (Macquarie Island, Southern Ocean) V21B-2505 Abstract Fall Meeting, AGU.
- Pieters, C.M. McCord, T.B. **Saal, A.E.** , Taylor, L.A. Bussey, B. Elphic, R.C. (2011) Whence, Whither, Wherefore, oh Lunar Water? P13H-01 Abstract Fall Meeting, AGU.
- Newcombe M., Fabbriozio A., Zhang Y., Le Voyer M., Guan Y., Ma C., Eiler J., **Saal A.E.**, Stolper E. -(2011) - Zonation of volatile and major elements in basaltic melt inclusions: a snapshot of syn-eruptive processes V52C-06 Abstract Fall Meeting, AGU.
- †Shimizu, K., **Saal, A.E.**, Hauri, E.H., Nagle, A., Forsyth, D.W., Niu, Y. (2011) Volatile Content of the Mid-ocean Ridge Mantle Inferred from Off-axis Seamounts and Intra-transform Lavas DI21A-2062 Abstract Fall Meeting, AGU.
- ***Saal A. E.** , Hauri E. H., Rutherford M. J., Van Orman J. A. (2011) The Volatile Contents and D/H Ratios of the Lunar Picritic Glasses [#6034]. A Wet vs. Dry Moon: Exploring Volatile Reservoirs and Implications for the Evolution of the Moon and Future Exploration, Houston, Texas. *Invited Talk*
- †Wetzel D. T., Rutherford M. J., Jacobsen S. D., Hauri E. H., **Saal A. E.** (2011) C-Solubility in Magmas at Low

fO2. Goldschmidt Conference, Prague, Czech Republic.

†Wetzel D. T., Rutherford M. J., Jacobsen S. D., Hauri E. H., **Saal A. E.** (2011) Carbon Solubility in Lunar Magmas [#6040]. A Wet vs. Dry Moon: Exploring Volatile Reservoirs and Implications for the Evolution of the Moon and Future Exploration, Houston, Texas

Rutherford M. J., †Wetzel D., Hauri E. H., **Saal A.E.** (2011) Origin and Composition of Lunar Volcanic Gas: The Picritic Glass Model [#6010]. A Wet vs. Dry Moon: Exploring Volatile Reservoirs and Implications for the Evolution of the Moon and Future Exploration, Houston, Texas

†Weber A., **Saal A. E.**, Hauri E. H., Rutherford M.J., Van Orman J. (2011) The Volatile Content and D/H Ratios of the Lunar Picritic Glasses [#2571]. 42th Lunar and Planetary Science Meeting, Houston, Texas.

***Saal A. E.**, Hauri E. H., Rutherford M.J., Van Orman J., (2011) Origin of the lunar water: The Volatile Content and D/H Ratios of the Lunar Picritic Glasses. Microsymposium 52 "The Moon: The First Billion Years of Crustal Evolution". Houston, Texas.

Hauri, E.H., **Saal, A.E.**, Rutherford, M., Van Orman, J., - (2010) - Hydrogen Isotope Similarity of the Earth and Moon Revealed by Water in Lunar Volcanic Glasses. 42th Meeting of the Division of Planetary Sciences, American Astronomical Society, Pasadena. *Invited Talk*.

†Weber, A.K., Head, J.W., **Saal, A.E.**, Weinreich, T., Wilson, L. - (2010) - Volatiles in lunar fire fountaining eruptions and the effect of rotation on droplets in free flight [#1208]. . 41th Lunar and Planetary Science Meeting, Houston, Texas.

†Wetzel, D.T., Rutherford M.J., Hauri, E.H., **Saal, A.E.** - (2010) - Carbon in lunar magmas: abundance, speciation and role in magmatic processes [#1827]. 41th Lunar and Planetary Science Meeting, Houston, Texas.

†Wetzel, D.T., **Saal, A.E.**, Rutherford M.J., Hauri, E.H. - (2010) - Evidence for sulfur degassing in oceanic basalts. AGU Fall Meet. Suppl., Abstract V34C-04.

†Peterson, M.E., **Saal, A.E.**, Hauri, E.H., Werner, R., Hauff, S.F., Kurz, M.D., Geist, D., Harpp, K., - (2010) - Sources of volatiles in basalts from the Galapagos Archipelago: deep and shallow evidence. AGU Fall Meet. Suppl., Abstract V51D-05.

Hauri, E.H., **Saal, A.E.**, - (2010) - Water and carbon heterogeneity in MORB mantle sources. AGU Fall Meet. Suppl., Abstract V24C-05. *Invited Talk*

Hauri, E.H., **Saal, A.E.**, Van Orman, J., Rutherford, M.J. - (2010) - Juvenile water in the Moon's interior: new constraints from Apollo 15 lunar volcanic glasses. AGU Fall Meet. Suppl., Abstract P41A-01.

Hirth, G., Parmentier E.M., **Saal A.E.** - (2010) - Accumulation of melt and volatiles at the base of the lithosphere: Implications for the origin of the EMORB geochemical reservoir and seismic G-discontinuity. AGU Fall Meet. Suppl., Abstract DI32A-03.

Invited Departmental Lectures (since 2008)

2008 Department of Earth and Planetary Sciences American Museum of Natural History.

2008 Department of Terrestrial Magnetism, Carnegie institution of Washington.

2008 Departamento de Geologia, Universidad Nacional de Cordoba, Argentina

2008 Department of Earth and Atmospheric Sciences, Cornell University.

2008 Division of Geological and Planetary Sciences, California Institute of Technology.

2009 NASA Head Quarters

2009 Department of Earth Sciences, Rice University

2009 Department of Earth Sciences, Dartmouth College

2009 Lunar and Planetary Institute, Houston, Texas

2009 CIDER (Cooperative Institute for Deep Earth Research) Pt. Reyes, CA.

2010 Department of Geology and Geophysics, Yale University

2010 Institut de Physique du Globe de Paris, France.

2011 DEAPS, MIT

2011 Department of Earth and Planetary Sciences, Washington University

2011 GSO-URI
 2011 Gordon Conference
 2012 Workshop at Oxford University
 2012 WHOI
 2012 Department of Earth Sciences University of Minnesota
 2012 400th anniversary the Universidad Nacional de Cordoba, Argentina (Invited)
 2013 Royal Society of London
 2013 LPI
 2013 Brown University
 2014 Institut de Physique du Globe de Paris, France.
 2014 Center de Recherche Petrographiques et Geochimiques, Nancy, CNRS, France.
 2015 Department of Earth and Environmental Sciences, University of Rochester.
 2016 Institute for Planetary Material, Okayama university, Misasa, Japan
 2016 Institut de Physique du Globe de Paris, France.
 2017 Observatoire de la Côte d'Azur, France
 2017 Université de Montpellier, France
 2017 Université Blaise Pascal, Clermont-Ferrand, France
 2017 Oxford University, Dept. Earth Sciences, Oxford, United Kingdom
 2017 Oxford University, Dept. AOPP, Oxford, United Kingdom
 2017 Open University, Milton Keynes, United Kingdom
 2017 Universität Bremen, Germany
 2017 Münster University, Germany
 2018 Cornell University
 2018 MIT
 2018 Universidad Nacional de Rio Negro, Argentina
 2018 Universidad Nacional de Bahia Blanca, Argentina
 2018 Universidad Nacional de Rio Cuarto, Argentina
 2018 Universidad Nacional de Cordoba, Argentina
 2019 University of New Mexico
 2019 University of Michigan

5. Research and Education Grants (since 2003)

NSF-EAR-2242269 The transition from normal subduction to slab window, unraveling its effect on the subcontinental lithospheric mantle of southern Patagonia. PI: Saal, Total budget: \$335,370. 3/1/2023- 2/28/2026. Pending

NASA-SSERVI Lunar Structure, Composition and Processes for Exploration (LunaSCOPE). Co-I Saal, Total budget: \$7,500,000. 7/1/23 - 6/30/28. Pending

NSF-PLR – Antarctic Earth Sciences-21122214 "The transition from back arc to slab window to continental rifting, evidence from the subcontinental lithospheric mantle of West Antarctica". PI: Saal, Total budget: \$322,107. Period: 3/1/22-2/28/25

NASA-SSW-18-SSW18-0011 "Constraining the Li and B Budget and $\delta^7\text{Li}$ and $\delta^{11}\text{B}$ ratios of the Moon's Interior using Lunar Volcanic Glasses, Melt Inclusions, Olivine and Pyroxene Phenocrysts". PI: Saal, Total budget: \$356,505. Period: 1/1/20-12/31/22.

NSF-EAR Petrology and Geochemistry-1829464 "Southernmost Patagonia: The connection between magmatism, subduction zone, slab window and sub-continental mantle lithosphere" PI: Saal. Total Budget: \$ 311,563. Period 07/01/2018-06/31/2021.

NSF-Ocean Sciences- 1657659 "The Volatile Contents of Chile Ridge MORB, Unraveling their Arc Signature" PI: Saal. Total Budget: \$ 214,547. Period 2/15/2017-1/31/2019.

NSF-PLR – Antarctic Earth Sciences- 1643494 "Magmatic volatiles, unraveling the reservoirs and processes of the volcanism in the Antarctic Peninsula". PI: Saal. Total Budget: \$ 270,041. Period 2/15/2017-1/31/2020.

BROWN-GELT (Global Experiential and Learning Program phase two grant) PI Saal. Total Budget \$35,000 for

international field trip to Argentina Period January 2016.

NSF Ocean Sciences-1355932 “Sr, Nd, Pb and Hf isotopes of basalts from the Quebrada/Discovery/Gofar transform fault system; key to test models of melt generation, transport and focusing beneath mid-ocean ridges”. PI: Saal. Total Budget: \$137,898. Period 2/15/2014-1/31/2015.

NSF CSEDI-1364635 “Layering within cratonic lithosphere: Integrated constraints from xenoliths, seismic structure and geodynamical modeling”. Co-I: Saal. Total Budget: \$519,493. Period 6/1/2014-5/31/2016.

NASA Cosmochemistry 2012 “Abundance, distribution and origin of volatile elements (C, H, F, S and Cl) and D/H ratios in lunar picritic glasses”. PI: Saal. Total award: \$455,000, Period: 6/1/12-5/31/15.

NASA-SSERVI (Solar System Exploration Research Virtual Institute) multi-institution and multi-PI proposal was granted, representing a total of \$5,553,000 over the period of 4 years 3/7/2014-2/14/2019.

FONCYT (Fondo para la Investigación Científica y Tecnológica de Argentina) FONCYT: PICT#265 Raíces Convocatoria 2011 “Variaciones composicionales del volcanismo máfico Plioceno-Reciente entre los 37° y 45° S y su significado geotectónico”. Co-I: Saal. Period 2012-2015. \$300,000 Argentine pesos (~ \$40,000 USdollars)

SECYT-UNC (Secretaria de Ciencia y Tecnologia de la Universidad Nacional de Cordoba) “Volcanismo monogenético cuaternario en el arco/retroarco de la Zona Volcánica Sur (33-46°S): Relación entre estilo eruptivo y contenido de volátiles.” Co-I: Saal. Period 2012-2013. \$20000 Argentine pesos (~ \$3,000 US dollars)

NSF Ocean Sciences-0962195 “Collaborative Research: The Volatile Contents of Seamount and Intra-Transform Lavas from the EPR: Deconstructing the Aggregation process in MORB. PI: Saal. Total Budget: \$204,745. Period 3/15/2010-3/14/2012.

NSF-MRI “Acquisition of a Multi-Collector Inductively Coupled Plasma Mass Spectrometer”. PI: Saal. Total Budget: \$677,890. Period 8/16/2009-8/15/2010.

NASA Lunar Science Institute Cooperative Agreement Notice “The Moon as Cornerstone to the Terrestrial Planets: The Formative Years” PI: Pieters, CoI: Saal. Total Budget: \$5,400,000 Period 1/1/09-12/31/2012.

NSF EAR-0810191 “Collaborative Research: the Geodynamics of the Andean Southern Volcanic Zone, A Geochemical Approach” PI: Saal, CoI: Hauri. Total award: \$234,067, Period: 7/1/08-6/30/2011.

NASA LASER “In Search of the Primitive Volatile Content of Lunar Magmas” PI: Saal. Total award: \$347,507, Period: 8/15/08-8/14/11

NASA Cosmochemistry “Abundance and Distribution of Volatile Elements (CO₂, H₂O, F, S and Cl) in the Lunar Picritic Glasses” PI: Saal. Total award: \$154,000, Period: 4/1/07-3/31/09

NSF Ocean Sciences-0527152 “Sampling Basalts in the Quebrada-Discovery-Gofa Transform Fault System: Testing Models of Mantle Flow and Melt Transport” PI: Forsyth, CoI: Saal. Total award: \$613,739, Period: 1/1/06-12/31/08. This proposal included support for Research Experience for Undergraduates, which made possible to integrate four Freshmen, from the course taught by Saal, in the research cruise and to support their Group Independent Study at Brown University.

NSF Earth Sciences-0403107 “The Galapagos Plume Geodynamics, A Geochemical Approach” PI: Saal. Total award: \$128,843, Period:1/1/02-12/31/03, transferred to Brown University: \$125,297 Period: 6/1/03-5/31/06

NSF Ocean Sciences-0335310 “Deconvolving the Galapagos Plume” PI: Saal. Total award: \$178,410, Period:1/1/02-12/31/03, transferred to Brown University: \$124,565 Period: 4/1/03-1/31/06

6. Professional Service

To Brown University

Department of Earth Environmental and Planetary Sciences

2003-2004 Chair’s Advisory Committee

2003-2004 Faculty Leader Fall Undergraduate Field Trip

2003-present Ph.D. Advisory Committee of 69 Graduate Students

2003-present Preliminary Examination Committee of 33 Graduate Students
 2003-present M.Sc. Examination Committee of 33 Graduate Students
 2003-present Ph.D. Thesis Examination Committee of 13 Graduate Student
 2004-present Safety and Physical Facilities Committees.
 2005 Search Committee Earth System History position.
 2006-2009 Electron Probe Facility Manager.
 2008 Faculty Leader Spring-break Undergraduate Field Trip.
 2009-2010 Chair's Advisory Committee
 2012 Faculty Leader Spring Undergraduate Field Trip
 2012 Faculty Leader Fall Undergraduate Field Trip
 2013-2020 Chair's Advisory Committee
 2018-2020 Curriculum Committee
 2014-2015 Search Committee Planetary position
 2018-2019 Chair Search Committee Geochemistry Position
 2020-2021 Colloquium Committee
 2021 Faculty Leader Fall Undergraduate Field Trip
 2021 Planetary Faculty Search Committee
 2021 TOP Faculty Search Committee
 2022 Chair's Advisory Committee
 2022 Search Committee Planetary Position (DIAP Rep.)
 2022 Cobb's Tenure Committee,
 2022 Chair Parman's Promotion Committee

University-Level

2005-present Advisor of 60 Freshmen and 29 Sophomore undergraduates.
 2012 Representing Brown at the Ivy+ STEM Symposium at U. Penn
 2012 TEDx conference Cordoba, Argentina (Invited)
 2021-present Tenure, Promotions and Appointments Committee

To the Profession

2003-present National Science Foundation, NASA Advisory Panel
 2002-present Reviewer of many scientific journals
 2003, 2009 Participant & invited speaker, CIDER (Coop. Instit. for Deep Earth Res.) Pt. Reyes, CA.
 2004-2012 Northeast National Ion Microprobe Facility, WHOI, Oversight Committee
 2004-2005 Judge, Outstanding Student Presentations, Volcanology, Geochemistry and Petrology section, AGU
 2009 Symposium Co-convener "Integrated Studies of Mid-Ocean Ridge Magmatism: From Top to Bottom", Goldschmidt Conference 2009
 2011 Course Geochemistry at the University of Cordoba, Argentina
 2012 Course of Petrology-Geochemistry University of Cordoba, Argentina
 2014-2016 Award Nominations Committee of the Geochemical Society.
 2016-2018 Chair Award Nominations Committee of the Geochemical Society.
 2018 Co-convener "Mineralogy, Petrology and Processes in the Mantle Transition Zone and the Lower Mantle Budgets and Isotopic Compositions of Volatiles in the Interior of the Earth and Other Terrestrial Planets", Goldschmidt Conference, Boston, USA.
 2018 Co-convener "Basaltic Magmatism: Constraints from Trace Elements", AGU Fall meeting, DC, USA
 2019 Co-convener "The Budgets and Isotopic Compositions of Volatile Elements in the Earth and Other Terrestrial Planets. A Session in Honor of Erik Hauri" Goldschmidt Conference, Barcelona, Spain
 2021 Co-convener "Origins and planetary budgets of volatile elements in the Earth's interior: accretion, degassing, ingassing" Goldschmidt Conference, Lyon, France.

Affiliations

American Geophysical Union; Geochemical Society.

7. Academic Awards and Fellowships

2016/17 Guggenheim Fellowship
 2016/17 Fulbright Scholar Fellowship
 2009 Master of Arts *ad eundem gradum*
 1999-2001 NSF-RIDGE Postdoctoral Fellow NSF-Ocean Sciences.
 1999-2001 Postdoctoral Fellow, Lamont Doherty Earth Observatory, Columbia University
 2000 "Ruth and Paul Fye Best Paper Award". Best student paper period 1996-2000 Department of Geology and Geophysics, WHOI.
 1993-1999 Research Assistant in Geochemistry, Woods Hole Oceanographic Institution.
 1993 Teaching Assistant, Massachusetts Institute of Technology.
 1991-1993 Research Assistant Geochemistry, Massachusetts Institute of Technology.
 1986-1991 Teaching Assistant Geochemistry. Universidad Nacional de Tucuman, Argentina.
 1986-1991 Graduate Fellowship from the CONICET, Argentina.
 1983-1985 Undergraduate Research Assistant. Universidad Nacional de Cordoba, Argentina.
 1981-1984 Undergraduate Teaching Assistant. Universidad Nacional de Cordoba, Argentina.

8. Brown University Teaching responsibility and Students Evaluation

EEPS 1730 Isotope Geochemistry taught in 2022. Enrollment 12 students

EEPS 2730 Isotope Geochemistry taught in 2004, 2005, 2006, 2009, 2010, 2016, 2018, 2021. Enrollment ranged from 3 to 14 students.

EEPS 1420 Igneous and Metamorphic Petrology taught from 2004 to 2015. Enrollment ranged from 3 to 11 students.

EEPS 0160E First Year Seminar: Volcanology taught in 2005, 2006, 2008, 2012, 2013, 2019. Enrollment ranged from 14 to 23 students.

EEPS 0160P First Year Seminar: Forensic Isotopes taught in 2021. Enrollment ranged from 10 students.

EEPS 0230 Earth/Planet Material/Process taught in 2005, 2018, 2019, and fall and spring of 2020, spring 2022. Enrollment ranged from 10 to 20 students.

EEPS 0010 Face of the Earth taught in 2014 and 2015. Enrollment ranged from 86 to 107 students.

EEPS 1560 Global Tectonics co-taught with Hirth and Forsyth in 2015 (as GELT course) and in 2018 and with Hirth and Dalton in 2020, 2022. Enrollment ranged from 13 to 15 students.

EEPS 2910 Volcanism and Climate co-taught with Parman, Russell, Fox-Kemper in 2014. Enrollment 10 students.

EEPS 2910X Interaction Tectonic & Climate co-taught with Dalton and Herbert in 2019. Enrollment 11 students.

EEPS 2910 Volatile in Magmas co-taught with Rutherford in 2005. Enrollment 5 students.

EEPS 2920Q Rheological Boundaries in the Earth co-taught with Hirth and Parmentier in 2009. Enrollment 8 students.

EEPS 2920R Evolution of the Moon I co-taught with Liang in 2010. Enrollment 12 students.

EEPS 2920L Evolution of the Moon II co-taught with Liang in 2010. Enrollment 17 students.

EEPS 0160P From Human Migration to Solving Crimes: The World of Forensic Isotopes. Enrollment 5 students.

GS 0012 Freshmen independent Study on Mid-Ocean Ridge processes in 2006. Enrollment 4 students.

Undergraduate Senior Thesis Advised

Nora Sullivan	Sc.B. Geological Sciences 2008
Benjamin Friedman	A.B. Geological Sciences 2009
Harrison Lisabeth	Sc.B. Geological Sciences 2010
Sophie Kuhl	Sc.B. Geological Science 2021

Graduate Students Advised

Koleszar, Alison M.Sc. 2007
 Myers, Corinne M.Sc. 2007
 Nagel, Ashley M.Sc. 2008
 Kei Shimizu M.Sc. 2012, Ph.D. 2016
 Mary E. Peterson M.Sc. 2011, Ph.D. 2015
 Diane Wetzel M.Sc. 2011, Ph.D. 2014
 Benjamin Parks M.Sc. Ph.D. 2019
 Fernando Calabozo Ph.D. 2016 Universidad Nacional de Cordoba, Argentina
 Danny Anderson 2018-present Ph.D. candidate
 Imani Guest 2018-present Ph.D. candidate
 Thomas William 2021-present Ph.D. candidate co-advise with Prof Parman
 Emily Fischer 2022-present Ph.D. candidate co-advise with Prof Parman
 Barbara Boltshauser 2022 PhD candidate Universidad Nacional de Rio Negro, Argentina
 Juan Presta visiting Universidad Nacional de Cordoba 2015
 Cristóbal González Rodríguez visiting Universidad Católica del Norte, Chile 2017
 Giuliano Camiletti Fulbright fellow visiting Universidad Nacional de Rio Cuarto, Argentina 2019

Postdocs Advised

Emily Chin 2014-2016
 Ryan A. Portner 2014-2016
 Todd Bianco 2010-2012
 Fernando Calabozo 2016

Hosted Visiting Scientist

2017 Dr. Sofia Perez-Lujan Universidad Nacional de San Juan

Graduate Advisors

S.R. Hart Ph. D. advisor
 F.A. Frey M.S. advisor

Postdoctoral Advisor

Charles Langmuir
 Erik Hauri

9. Other Information

Other Degree and Positions

1977-1979 *Optical Technician* specialized on contact lenses and optical instruments; Escuela Nacional de Educacion Tecnica N°1 Amadeo Sabattini; Cordoba, Argentina.
 1985 Research Assistantship (laboratory and field work) at the Direccion de Minería, Subsecretaria de Minería (Mining); Ministry of Industry, Argentina.
 1986-1991 Research Scientist "Instituto Superior de Correlacion Geologicas; CONICET", Argentina. Research Subject: Famatina System - Pampean Range - Andean Magmatism.
 1993-1999 Graduate Resident Tutor (GRT) at Bexley House, MIT.

Field Work Experience

2018 Sample Collection: Southern Patagonia, Argentina
 2012 Sample Collection: Tibetan Plateau, China
 2012 Sample Collection: Mauna Loa and Kilauea volcanoes, Big Island, Hawaii
 2009-2010 Sample Collection: Patagonian Andes, Argentina and Chile
 2006 Sample Collection: Santiago Island, Galapagos Archipelago.
 1999 Sample Collection: Tau and Tutuila islands, Samoa island chain

- 1998 Sample Collection: Several islands of the Galapagos Archipelago.
1997 Sample Collection: Several islands of the Galapagos Archipelago.
1992 Sample Collection: Southern Volcanic Zone, Andean Magmatism, Argentina
1985-1989 Sample Collection: 7 field campaigns to the Ordovician Magmatic Arc, Argentina

Shipboard Experience

- 2006 Co-Chief Scientist, R/V Knorr during KN182-13 Leg cruise. Dredging and rock coring of submarine lavas, and seabeam mapping of the Quebrada-Discovery-Gofar fracture zone system EPR (3°-5°S).
- 2001 Shipboard Scientist, R/V Revelle during DRIFT4 cruise. Dredging and rock coring of submarine lavas, and seabeam mapping of the Galapagos Archipelago.
- 1999 Shipboard Scientist, R/V Melville during AVON3 cruise. Dredging and rock coring of submarine lavas, and seabeam mapping of the submarine eastern leading edge of the Samoa chain.

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