CURRICULUM VITAE

Alberto E. Saal
Department of Earth Environmental and Planetary Sciences, Brown University, 324 Brook St., Providence, RI 02912; Tel. 401/863-7238, Fax 401/863-2058, E-mail asaal@brown.edu

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

2009-present 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):

†Wetzel D. T., Hauri E. H., **Saal A. E.**, Rutherford M. J., - (2015) -Carbon Content of the Lunar Volcanic Glasses and Melt Inclusions. Submitted to Nature Geosciences under revisions after review.

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 (2015) 252–264.

†Wetzel D.T., Jacobsen, S.D., Thomas, S-M, Hauri E. H., Rutherford M. J., **Saal A. E.** - (2015) - Speciation of Water in the Lunar Picritic Glasses. Geochimica et Cosmochimica Acta. Under revisions after review process.

Burgess, K.D., **Saal, A.E.**, Liang Y., Hauri, E.H**.**, Koleszar A.M., Cooper R.F. - (2015) - The Origin of 'Ghost Plagioclase': Evidence from the Galápagos Plume. Journal of Petrology. Under revisions after review process.

Cagnioncle, A.M., **Saal, A.E.** and Parmentier, E.M. - (2015) - U-series systematics at convergent margins. Earth and Planetary Science Letters. Under revisions after review process.

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

Newcombe M. E.; Fabbrizio 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.

Kurz, M.D., Rowland, S.K., Curtice, J., **Saal, A.E.**, Naumann, T. - (2013) - Eruption rates for Fernandina volcano: a new chronology at the Galápagos hotspot center. AGU monograph (K. Harpp and E. Mittlestedt, editors) accepted with minor revisions.

Handley, H. K., Turner, S. Berlo, Beier, K. 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 ^{210}Pb 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 H_2O 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 ^{3}He/^{4}He. Geochemistry, Geophysics and Geosystems, 9 (4) doi:10.1029/2007GC001876. **[1]**

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. **[3]**

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. **[1]**

Bourdon, B., Ribe, N.M., Stracke, A., **Saal, A.E.** and Turner, S.P. - (2006) - Insights into the dynamics of mantle plumes from U-series geochemistry. Nature 444, 713-717. **[9]**

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 Cosmoquimica Acta 70, 4797-4812. **[4]**

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 lithopshere. Earth and Planetary Science Letters 240, 605-620. **[9]**

Saal, A.E., Hauri, E.H., Langmuir, C.H. and Perfit, M.R. - (2004)- Reply to "The role of fO_2 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. **[1]**

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. **[9]**

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. **[83]**

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. **[23]**

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. **[7]**

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. **[26]**

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. **[70]**

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. **[48]**

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). Münchner 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 to be summited March 2015 (available if requested)

†Peterson, M., Saal, A., Kurz, M.D., Hauri, E.H., Werner, R., Hauff, F., Geist, D.J., Harpp, K.S. - (2015) - The volatile budget of the Galapagos Plume: unraveling deep and shallow signatures. To be submitted to Journal of Petrology.

†Shimizu, K., Saal, A.E., Myers, C.E., Nagel, A.N., Hauri, E.H., Forsyth, D.W., Kamenetsky, V.S., Niu, Y.L. - (2015) - The Generation of MORB and the Volatiles Contents of the Heterogeneous Upper Mantle. To be submitted to Geochimica et Cosmoquimica Acta.

Manuscript in Preparation

Saal, A.E., Bourdon, B., Kurz, M.D., Hart, S.R., Blichert-Toft, J., Blusztajn, J.S., Sims, K.W., Lane, G.D., and Geist, D.J. U series isotopic variability in Galapagos lavas, evidence of a mildly buoyant plume. To be submitted to Geochemica et Cosmochemica Acta.

Published Presentation Abstracts since 2010 (* denotes Saal as speaker; † denotes Saal's student as speaker):

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]

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]

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.; Fabbrizio 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., Fabbrizio 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., Fabbrizio 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 Sciennce 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 Sciennce 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 Sciennce 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

5. Research and Education Grants (since 2003)

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-IES-1516137 “Collaborative Research: The interdependent co-evolution of subduction zone and subcontinental lithospheric mantle; an interdisciplinary study in the Patagonian Andes”. PI: Saal. Total Budget: $ 1,625,372. Submitted.

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 37º y 45º 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 (CO_2, H_2O, F, S and CI) 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 44 Graduate Students
2003-present Preliminary Examination Committee of 25 Graduate Students
2003-present M.Sc. Examination Committee of 25 Graduate Students
2003-present Ph.D. Thesis Examination Committee of 12 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-present Chair's Advisory Committee
2014-2015 Search Committee Planetary position

University-Level

2005-present Advisor of 30 Freshmen and 14 Sophomore undergraduates.
2012 Representing Brown at the Ivy+ STEM Symposium at U. Penn
2012 TEDx conference Cordoba, Argentina (Invited)

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-present Award Nominations Committee of the Geochemical Society.

Affiliations

American Geophysical Union; Geochemical Society.

7. Academic Awards and Fellowships

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

Course Number	*Title*	*Semester*	*enrolment*	*Score*
GEOL 2730	Isotope Geochemistry	Fall 2003	n= 6	X = 1.7**

GEOL 2730	Isotope Geochemistry	Fall 2004	n= 8	X = 2.4**
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2004	n= 10	X = 3.2
GEOL 2730	Isotope Geochemistry	Fall 2005	n= 6	X = 2.7**
GEOL 0160	First Year Seminar: Volcanology CAP	Fall 2005	n= 18	X =1.5
	Critical Review Professor average score = 1.2	Course average score = 1.3		
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2005	n= 8	X = 1.6
GEOL 0230	Geochemistry	Spr 2005	n= 18	***
GEOL 2910	Volatile in Magmas	Spr 2005	n= 2	****
GEOL 2730	Isotope Geochemistry	Fall 2006	n= 5	X = 3.1**
GEOL 0160	First Year Seminar: Volcanology CAP	Fall 2006	n= 23	X = 1.6
	Critical Review Professor average score = 1.6	Course average score = 1.4		
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2006	n= 11	X = 2.2*
GS 0012	Freshmen independent Study on MORB	Spr 2006	n= 4	X = 1.5
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2007	n= 2	
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2008	n= 7	X = 1.7
GEOL 0160	First Year Seminar: Volcanology CAP	Fall 2008	n= 22	X = 1.8
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2009	n= 8	X = 1.8
GEOL 2920Q	Rheological Boundaries in the Earth	Spr 2009	n= 8	X= 2.0*****
GEOL 2730	Isotope Geochemistry	Fall 2009	n= 11	X=1.5**
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2010	n= 8	X = 1.4
GEOL 2730	Isotope Geochemistry	Fall 2010	n= 9	X=1.6**
GEOL-2920-R	Evolution of the Moon I	Fall 2010	n= 12	X=1.5$^{\#}$
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2011	n= 5	X = 1.07
GEOL-2920-L	Evolution of the Moon II	Fall 2011	n= 17	X=1.5$^{\#}$
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2012	n= 3	X = ND
GEOL 0160	First Year Seminar: Volcanology CAP	Spr 2012	n-19	X = 1.9
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2013	n= 3	X = ND
GEOL 0160	First Year Seminar: Volcanology CAP	Fall 2013	n-14	X = ND
GEOL 0010	Face of the Earth	Spr 2014	n=86	X= 1.4
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2014	n= 8	X = 1.5
GEOL 2910	Volcanism and Climate	Fall 2014	n=10	X = ?$^{\#\#}$
GEOL 0010	Face of the Earth	Spr 2015	n=107	X= ~
GEOL 1420	Igneous and Metamorphic Petrology	Spr 2015	n= 10	X =

n = students enrolled; X = average score (range 1-6 with 1 being the highest)

CAP: Curricular Advising Program allows first-year students to enroll in a course taught by a faculty member who is also their academic advisor.

GS: Group Independent Study

Courses co-taught with *P. Hess, **L.P. Gromet, ***M. Rutherford and R. Cooper, ****M. Rutherford, *****G.Hirth and M. Parmentier, #Y. Liang, $^{\#\#}$S. Parman, J. Russell, B. Fox-Kemper, ~R. Cooper, S. Parman

Undergraduate Senior Thesis

Nora Sullivan	Sc.B.	Geological Sciences 2008
Benjamin Friedman	A.B.	Geological Sciences 2009
Harrison Lisabeth	Sc.B.	Geological Sciences 2010

Graduate Students

Koleszar, Alison	M.Sc.	Geological Sciences 2007	
Myers, Corinne	M.Sc.	Geological Sciences 2007	
Nagel, Ashley	M.Sc.	Geological Sciences 2008	
Kei Shimizu	M.Sc	Geological Sciences 2012	present Ph.D. candidate
Mary E. Peterson	M.Sc.	Geological Sciences 20011	present Ph.D. candidate
Diane Wetzel	M.Sc.	Geological Sciences 2001,	Ph.D. 2014

Benjamin Parks	present Ph.D. candidate
Juan Presta	Ph.D. candidate Universidad Nacional de Cordoba, Argentina
Fernando Calabozo	Ph.D. candidate Universidad Nacional de Cordoba, Argentina

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 Nº1 Amadeo Sabattini; Cordoba, Argentina.
1985	Research Assistantship (laboratory and field work) at the Direccion de Mineria, Subsecretaria de Mineria (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

2012	Sample Collection: Tibetan Plateau, China
2012	Sample Collection: Mauna Loa and Kilauea volcanoes, Big Island, Hawaii
2009-2010	Sample collecting: Patagonian Andes, Argentina and Chile
2006	Sample collecting: Santiago Island, Galapagos Archipelago.
1999	Sample collecting: Tau and Tutuila islands, Samoa island chain
1998	Sample collecting: Several islands of the Galapagos Archipelago.
1997	Sample collecting: Several islands of the Galapagos Archipelago.
1992	Sample collecting: Southern Volcanic Zone, Andean Magmatism, Argentina
1985-1989	Sample collecting: 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 (3º-5ºS).
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.