

Peter B. Larson

Professor
School of the Environment
Washington State University
Pullman, Washington 99164-2812
USA

Phone: (509) 335-3095
FAX: (509) 335-7816
e-mail: plarson@wsu.edu

HIGHER EDUCATION

B.S. Michigan Technological University, 1973, Geology

M.S. University of Arizona, 1976, Geology

Ph.D. California Institute of Technology, 1984, Geology

PROFESSIONAL EXPERIENCE

January, 2015, to August, 2016: Associated Director of Graduate Studies and Research, School of the Environment, Washington State University, Pullman.

January to May, 2012: Sabbatical leave, Institut für Geochemie and Petrologie, Eidgenössische Technische Hochschule (ETH), Zürich, Switzerland.

January to May, 2006: Sabbatical leave, University of Lausanne, Switzerland.

August, 1998, to August, 2006: Chair, Department of Geology, Washington State University, Pullman.

August, 1996, to Present: Professor, Department of Geology, Washington State University, Pullman.

September, 1988, to August, 1996: Associate Professor, Department of Geology, Washington State University, Pullman.

August, 1995, to May, 1996: Sabbatical leave, University of Lausanne, Switzerland, and The Open University, Milton-Keynes, UK.

August, 1989, to May, 1990: Sabbatical leave, Centre de Recherches Petrographiques et Geochimiques, C.N.R.S., Nancy, France.

June to August, 1987: Summer Faculty, Geochemist, Lawrence Livermore National Lab, Livermore, California.

June to August, 1986: Summer Faculty, Geochemist, Lawrence Livermore National Lab, Livermore, California.

June to August, 1985: Visiting Associate in Geochemistry, Division of Geological and Planetary Sciences, California Institute of Technology, Pasadena, California.

September, 1983, to September, 1988: Assistant Professor, Department of Geology, Washington State University, Pullman.

August, 1979, to September, 1983: Research and Teaching Assistant, California Institute of Technology, Pasadena, California.

Summer, 1981: Geologist, Anaconda Copper Co., Rico, Colorado.

June, 1976 to August, 1979: Research Geologist (metals exploration), Atlantic Richfield Co., Dallas, Texas.

Summer, 1975: Geologist, WGM, Admiralty Island, Alaska.

Summer, 1974: Geologist, Exxon, Tucson, Arizona.

August, 1973, to June, 1975: Teaching Assistant, University of Arizona, Tucson, Arizona.

Summer, 1973: Geologist, U.S. Steel, Ishpeming, Michigan.

Summer, 1972: Geologist, Noranda, Rhinelander, Wisconsin.

Summer, 1971: Geologist, Bear Creek Mining Co., Ely, Minnesota.

PROFESSIONAL SERVICE

July, 2016 – present: Geological Society of America Awards Committee

I annually review between 5 and 10 manuscripts and proposals (total) for professional journals and for the National Science Foundation, respectively.

External reviewer for faculty member at the University of Witwatersrand, South Africa, for the National Research Foundation, South Africa

May, 2013, Panelist, National Science Foundation, FESD (one panel meeting)

April, 2012, Co-organized and presented (with Dr. Sarah Gleeson, University of Alberta) a short course at ETH, Zurich, titled "Stable isotope applications in continental hydrothermal systems". This was attended by approximately 30 faculty and students from various Universities in Germany and Switzerland.

September, 2009, Organized Geological Society of America Penrose Conference, "Low $\delta^{18}\text{O}$ rhyolites and crustal melting: Growth and redistribution of the continental crust", Twin Falls, ID, and Yellowstone Park, WY (with J. Wolff and I. Bindeman).

Fall, 2006, to Spring, 2008, Panelist, National Science Foundation, EAR (four panel meetings)

2005-2009, Associate Editor, Economic Geology.

2005, Chair, International Program Committee, 15th Annual Goldschmidt Conference, Moscow ID (I was one of three co-chairs for the meeting).

1998, Organized Society of Economic Geologists Short Course, "Techniques in Hydrothermal Ore Deposits Geology", Toronto (with J. Richards).

THESES

Larson, P.B., 1976, The Metamorphosed Alteration Zone Associated with the Bruce Precambrian Volcanogenic Massive Sulfide Deposit, Yavapai County, Arizona. M.S. Thesis, Univ. Arizona, Tucson, 99 p. (Adviser: Dr. Spencer Titley)

Larson, P.B., 1983, I. An $^{18}\text{O}/^{16}\text{O}$ Investigation of the Lake City Caldera, San Juan Mountains, Colorado. II. $^{18}\text{O}/^{16}\text{O}$ Relationships in Tertiary Ash-Flow Tuffs from Complex Caldera Structures in Central Nevada and the San Juan Mountains, Colorado. Ph.D. dissertation, Caltech, Pasadena, 469 p. (Adviser: Dr. Hugh P. Taylor, Jr.)

PROFESSIONAL ORGANIZATIONS

Society of Economic Geologists (Fellow)
Geological Society of America (Fellow)
American Geophysical Union
The Geochemical Society

GRANTS

2013-2016, \$295,134, "Collaborative research: Constraining heat flux from the shallow geothermal system, Yellowstone caldera, Wyoming", (Co-PI, with J

- Fairly, UofIdaho, total budget \$522,097), National Science Foundation.
- 2009-2013, \$210,593, "Super-eruptions, eruptive centers and time-volume behavior of a continental hotspot: the central Snake River Plain", (Co-PI, with PI Wolff), National Science Foundation.
- 2009-2010, \$25,000, "A conference on "Low-¹⁸O rhyolites and crustal melting: growth and redistribution of the continental crust", (Sole PI) National Science Foundation.
- 2009-2010, \$290,600, "Acquisition of a gas source isotope ratio mass spectrometer and high temperature elemental analyzer", (Sole PI) National Science Foundation.
- 2006-2008, \$140,040, "Older hydrothermal alteration in the Yellowstone Caldera", (Sole PI), National Science Foundation.
- 2006-2008, \$222,716, "Strongly ¹⁸O Depleted, High-Temperature Rhyolites of the Snake River Plain", (Co-PI, with PI Wolff and Co-PI's Hart, Larson, Bonnicksen, and Godchaux) National Science Foundation.
- 2005-2007, \$225,000, "Technician support (Phase I) for MC-ICPMS isotope facility, Washington State University" (Co-PI, with PI Vervoort and Co-PI Wolff), National Science Foundation.
- 2001-2003, \$176,762, "Uplift of the Washington Cascades and climatic evolution of eastern Washington" (co-PI, with Reiners (PI) at Yale University, and Montgomery at U of Washington), National Science Foundation
- 2000-2001, \$30,000, "Acquisition of a laser fluorination vacuum line for oxygen isotope ratio measurement" (PI, with Wolff), National Science Foundation
- 2000-2002, \$476,135, "Acquisition of a laser-ablation, inductively coupled plasma source, multicollector mass spectrometer (LA-ICP-MCMS) for isotope and trace element microanalysis" (Co-PI, with Wolff (PI), Hooper, Foit, and Dickinson), National Science Foundation
- 2000-2002, \$183,839, Interaction between magma and altered crust on a mature oceanic island: an isotope and trace-element study of the Diego Hernandez Formation, Las Canadas caldera, Tenerife, Canary Islands (Co-PI, with Wolff), National Science Foundation
- 1999-2000, \$475,000, "Purchase of a laser ablation, inductively coupled plasma source, multicollector mass spectrometer" (Co-PI, with Wolff (PI), Dickinson, Clark, and Reiners), Murdock Trust
- 1998-2003, \$50,000, "Geologic Research in Support of Mineral Resources Studies in

the Inland Northwest", United States Geological Survey

- 1995-1998, \$191,611, "Miocene Concentrations and $\delta^{13}\text{C}$ of Atmospheric Carbon Dioxide Inferred from Stomatal Density and $\delta^{13}\text{C}$ of Fossil Leaves" (Co-PI, with Marshall (PI) and Rember, both U of Idaho), National Science Foundation
- 1995-1996, \$46,272, "Groundwater Residence Times in the Pullman-Moscow Basin: A Stable Isotope Study (with Keller, Hathorne, Allen-King), State of Washington Water Research Center
- 1994, \$4,000, "Supplement to Measurement of the Background Geochemistry of the Unconfined Aquifer at the Hanford Site, Washington: Isotope Ratios of O, H, and C", Batelle/PNL
- 1994, \$20,532, "Measurement of the Background Geochemistry of the Unconfined Aquifer at the Hanford Site, Washington: Isotope Ratios of O, H, and C", Batelle/PNL
- 1993-95, \$100,000, "Investigation of Fluid Sources and the Effects of Water/Rock Interaction in a Fossil Hydrothermal Plume, Rico, Colorado" (Sole PI), National Science Foundation
- 1992-94, \$100,000, "Acquisition of a Gas Source Isotope Ratio Mass Spectrometer", National Science Foundation
- 1992-93, \$1,000 "Oxygen Isotope Investigations of Igneous Rocks, Northeastern Washington", WSU Division of Sciences Mini-grant
- 1989-91, \$59,243, "Constraints on the Duration of Water-Rock Interaction in the Rico Paleothermal Anomaly", (Sole PI), National Science Foundation.
- 1985-86, \$7691, "Mineral and Geochemical Zonation in a Large Epithermal Vein District", Washington State University Grant-In-Aid.
- 1985-86, \$4000, "Timing of Hydrothermal Alteration and Mineralization in the Western San Juan Mountains, Colorado", Washington Mining and Mineral Resources Research Institute.

PUBLICATIONS

Morgavi, D., Arzilli, F., Pritchard, C., Perugini, D., Mancini, L., Larson, P., and Dingwell, D.B., 2016, The Grizzly Lake complex (Yellowstone Volcano, USA): Mixing between basalt and rhyolite unraveled by microanalysis and X-ray microtomography: *Lithos*, v. 260, pp. 457-474.

- Andersen, A.K., Clark, J.G., Larson, P.B., and Neill, O.K., 2016, Mineral chemistry and petrogenesis of a HFSE(+HREE) occurrence, peripheral to carbonatites of the Bear Lodge alkaline complex, Wyoming: *American Mineralogist*, v. 101, pp. 1604-1623.
- Liu, L., Richards, J.P., Creaser, R.A., DuFrane, S.A., Muehlenbachs, K., and Larson, P.B., 2016, Geology and age of the Morrison porphyry Cu-Au-Mo deposit, Babine Lake area, British Columbia: *Canadian Journal of Earth Sciences*, v. 53, pp. 950-978.
- Lubenow, B.L., Fairley, J.P., Lindsey, C.R., and Larson, P.B., 2016, Influences on shallow ground temperatures in high flux thermal systems: *Journal of Volcanology and Geothermal Research*, v. 323, pp. 53-61.
- Lindsey, C.A., Fairley, J.P., Larson, P.B., and McMillan, N., 2015, Stochastic modeling and analysis of temperature data from hot springs in Yellowstone Caldera, Wyoming, USA: *Transactions of the Geothermal Resources Council*, 39.
- Lindsey, C.A., Lubenow, B., Fairley, J.P., and Larson, P.B., 2015, Ice box calorimetry: A test of applicability in non-steaming geothermal areas. *Transactions of the Geothermal Resources Council*, 39.
- Schleiffarth, K., and Larson, P., 2014, Eocene magmatism across the northern Cordillera: *Northwest Geology*, v. 43, pp. 15-20.
- Brueseke, M.E., Calliccoat, J.S., Hames, W., and Larson, P.B., 2014, Mid-Miocene rhyolite volcanism in northeastern Nevada: The Jarbidge Rhyolite and its relationship to the Cenozoic evolution of the northern Great Basin (USA): *Geological Society of America Bulletin*, v. 126, pp. 1047-1067.
- Sisson, T.W., Salters, V.J.M., and Larson, P.B., 2014, Petrogenesis of Mount Ranier andesite: Magma flux and geologic controls on the contrasting differentiation styles at stratovolcanoes of the southern Washington Cascades: *Geological Society of America Bulletin*, v. 126, pp. 122-144.
- Schleiffarth, K., and Larson, P., 2013, Above the Belt: Road Log of Eocene Challis Volcanic Group – U.S. Route 93 between Salmon and Ellis, Idaho: *Northwest Geology*, v. 42, pp. 353-364.
- Pritchard, C.J., Larson, P.B., Spell, T.L., and Tarbert, K.D., 2013, Mingled basalt and rhyolite complexes in the Norris Mammoth Corridor, Yellowstone National Park, WY: *Lithos*, v. 175-176, pp. 163-177.
- Lowenstern, J.B., Bleick, H., Vazquez, J.A., Castro, J.M., and Larson, P.B., 2012, Degassing of Cl, F, Li, and Be during extrusion and crystallization of the

- rhyolite dome at Volcan Chaiten, Chile during 2008 and 2009: *Bulletin of Volcanology*, v. 74, pp. 2303-2319.
- Boroughs, S., Wolff, J.A., Ellis, B.S., Bonnicksen, B., and Larson, P.B., 2012, Evaluation of models for the origin of Micoene low- $\delta^{18}\text{O}$ rhyolites of the Yellowstone/Columbia River large igneous province: *Earth and Planetary Science Letters*, v. 313-314, pp. 45-55.
- Pritchard, C.J., and Larson, P.B., 2012, Genesis of the post-caldera eastern Upper Basin Member rhyolites, Yellowstone, WY, from radiogenic isotope modeling: *Contributions to Mineralogy and Petrology*, v. 164, pp. 205-228.
- Takeuchi, A., Hren, M.T., Smith, S.V., Chamberlain, C.P., and Larson, P.B., 2010, Pedogenic carbonate carbon isotopic constraints on paleoprecipitation: Evolution of desert in the Pacific Northwest, USA, in response to topographic development of the Cascade Range: *Chemical Geology*, v. 277, pp. 323-335.
- Watts, K.E., Leeman, W.P., Bindeman, I.N., and Larson, P.B., 2010 Supereruptions of the Snake River Plain: Two-stage derivation of low- $\delta^{18}\text{O}$ crust as constrained by Archean xenoliths: *Geology*, v. 38, pp. 503-506.
- Larson, P.B., Phillips, A., John, D., Cosca, M., Pritchard, C., Andersen, A., and Manion, J., 2009, A preliminary study of older hot spring alteration in Sevenmile Hole, Grand Canyon of the Yellowstone River, Yellowstone Caldera, Wyoming: *Journal of Volcanology and Geothermal Research*, v. 188, pp. 225-236.
- Takeuchi, A., Goodwin, A.J., Moravec, B.G., Larson, P.B., and Keller, C.K., 2009, Isotopic evidence for temporal variation in proportion of seasonal precipitation since the last glacial time in the inland Pacific Northwest of the USA: *Quaternary Research*, v. 72, pp. 198-206.
- Moravec, B.G., Keller, C.K., Smith, J.L., Allen-King, R.M., Goodwin, A.J., Fairley, J.P., and Larson, P.B., 2009, Oxygen-18 dynamics in precipitation and streamflow in a semi-arid agricultural watershed, Eastern Washington, USA: *Hydrological Processes*, 24:446-460.
- Pittari, A., Cas, R.A.F., Wolff, J.A., Nichols, H.J., Larson, P.B. and Martí, J., 2008. The use of lithic clast distributions in pyroclastic deposits to understand pre- and syn-caldera collapse processes; a case study of the Abrigo Ignimbrite, Tenerife, Canary Islands. In: Gottsman J. (ed), *Caldera Volcanism: Analysis, Modelling and Response*. Elsevier, *Developments in Volcanology* 10, pp. 97-142.
- Takeuchi, A., Larson, P.B., and Suzuki, K., 2007, Influence of paleorelief on the Mid-Miocene climate variation in southeastern Washington, northeastern Oregon, and western Idaho, U.S.A.: *Paleogeography, Paleoclimatology, and*

- Paleoecology, v. 254, pp. 462-479.
- Maher, K.C., and Larson, P.B., 2007, Variation in copper isotope ratios and controls on fractionation in hypogene skarn mineralization at Corocochuayco and Tintaya, Peru: *Economic Geology*, v. 102, pp. 225-237.
- Boroughs, S., Wolff, J., Bonnicksen, B., Godchaux, M., and Larson, P., 2005, Large volume, low-¹⁸O rhyolites of the central Snake River Plain, Idaho, USA, *Geology*, v. 33, pp. 821-824.
- Lewis, R.S., Frost, T.P., Schmidt, K.L., Fleck, R.J., and Larson, P.B., 2005, Road log of the northwest border zone and main Bitterroot lobe of the Idaho batholith: 15th Annual Goldschmidt Conference, pre-meeting field trip, 29 p. (not peer reviewed)
- Takeuchi, A., and Larson, P.B., 2005, Oxygen isotope evidence for the Late Cenozoic development of an orographic rain shadow in eastern Washington, USA, *Geology*, v. 33, pp. 313-316.
- Larson, P.B., 2004, Cu isotope ratios in midocean ridge hydrothermal systems, *Economic Geology-An Invited Commentary on Journal Papers*, Society of Economic Geologists Newsletter, No. 56, pp. 32-33. (not peer reviewed)
- Cole, D.R., Larson, P.B., Riciputi, L.R., and Mora, C.I., 2004, Oxygen isotope zoning profiles in hydrothermally altered feldspars: Estimating the duration of water-rock interaction, *Geology*, v. 32, pp. 29-32.
- Larson, P.B., Maher, K., Ramos, F.C., Chang, Z., Gaspar, M., and Meinert, L.D., 2003, Copper isotope ratios in magmatic and hydrothermal ore forming environments, *Chemical Geology*, v. 201, pp. 337-350.
- Conrey, R.M., Hooper, P.R., Larson, P.B., Chesley, J., and Ruiz, J., 2001, Trace element and isotopic evidence for two types of crustal melting beneath a High Cascade volcanic center, Mt. Jefferson, Oregon, *Contributions to Mineralogy and Petrology*, v. 141, pp. 710-732.
- Morris, G.A., Larson, P.B., and Hooper, P.R., 2000, "Subduction style" magmatism in a non-subduction setting: The Colville Igneous Complex, Northeast Washington State, USA, *Journal of Petrology*, v. 41, pp. 43-67.
- Wolff, J.A., Grandy, J.S., and Larson, P.B., 2000, Interaction of mantle-derived magma with island crust? Trace element and oxygen isotope data from the Diego Hernandez Formation, Las Cañadas, Tenerife, Canary Islands, *Journal of Volcanology and Geothermal Research*, v. 103, pp. 343-366.

- Rosenberg, P.E., and Larson, P.B., 2000, Isotope geochemistry of ankerite-bearing veins associated with the Coeur d'Alene Mining District, Idaho, *Economic Geology*, v. 95, pp. 1689-1700.
- Larson, K.R., Keller, C.K., Larson, P.B., and Allen-King, R.M., 2000, Water resource implications of ^{18}O and ^3H distributions in a basalt aquifer system, *Ground Water*, v. 38, pp. 947-953.
- Campbell, A.R., and Larson, P.B., 1998, Introduction to Stable Isotope Applications in Hydrothermal Systems: In, Richards, J.P., and Larson, P.B., eds., *Reviews in Economic Geology*, Society of Economic Geologists, v. 10, pp. 173-193.
- Richards, J.P., and Larson, P.B., Editors, 1998, *Techniques in Hydrothermal Ore Deposits Geology: Reviews in Economic Geology v. 10*, Society of Economic Geologists, 256 pages.
- Larson, P.B., and Sharp, Z.D., 1998, Mineral oxygen isotope ratios for the Boehls Butte-Goat Mountain metamorphic complex, Idaho: Evidence for fast cooling: *American Journal of Science*, v. 298, pp. 572-593.
- Geist, D., Naumann, T., and Larson, P., 1998, Evolution of the Galapagos magmas: Mantle and crustal fractionation without assimilation: *Journal of Petrology*, v. 39, pp. 953-971.
- Barragan, R., Geist, D., Hall, M., Larson, P., and Kurz, M., 1998, Subduction controls on the compositions of lavas from the Ecuadorian Andes: *Earth and Planetary Science Letters*, v. 154, p. 153-166.
- Lowe, C.H., and Larson, P.B., 1996, Geology of the Key East Gold Deposit, Ferry County, Washington: In *Geology and Ore Deposits of the American Cordillera*: in, Coyner, A.R., and Fahey, P.L., eds., Geological Society of Nevada, Reno/Sparks, v. 3, pp. 1111-1132.
- Larson, K.R., Keller, C.K., Allen-King, R.M., Hathhorn, W.E., and Larson, P.B., 1996, Groundwater recharge and residence times in the Pullman-Moscow basin: a stable isotope study: State of Washington Water Research Center Report A-196-WASH, Pullman, 24 pages. (Not peer reviewed)
- Larson, P.B., and Geist, D., 1995, On the origin of low- ^{18}O magmas: Evidence from the Casto pluton, Idaho: *Geology*, v. 23, p. 909-912.
- Geist, D., Howard, K.A., and Larson, P., 1995, The generation of oceanic rhyolites by crystal fractionation: The basalt-rhyolite association at Volcán Alcedo, Galápagos Archipelago: *Journal of Petrology*, v. 36, p. 965-982.
- Marchev, P., Raicheva, R., and Larson, P., 1994, Magma mixing in a collisional setting: Preliminary data from the Tertiary volcanism in the Eastern Rhodope

- mountains, Bulgaria: *Comptes Rendus de l'Académie Bulgare des Sciences*, Tome 47, No. 3, p. 63-66.
- Larson, P.B., Cunningham, C.G., and Naeser, C.W., 1994, Large-scale alteration effects in the Rico paleothermal anomaly: *Economic Geology*, v. 89, p. 1769-1779.
- Neal, W.S., and Larson, P.B., 1994, Mineral and fluid geochemistry of the Hoosier vein, Chloride mining district, Sierra County, New Mexico: *Economic Geology*, v. 89, p. 1752-1768.
- Zimmerman, B.S., and Larson, P.B., 1994, Epithermal gold mineralization in a fossil hot spring system, Red Butte, Oregon: *Economic Geology*, v. 89, p. 1983-2002.
- Larson, P.B., Cunningham, C.G., and Naeser, C.W., 1994, Hydrothermal alteration and mass exchange in the hornblende latite porphyry, Rico, Colorado: *Contributions to Mineralogy and Petrology*, v. 116, p. 199-215.
- Larson, P.B., and Zimmerman, B.S., 1991, Variations in $\delta^{18}\text{O}$ values, water/rock ratios, and water flux in the Rico paleothermal anomaly, Colorado: in, Taylor, H.P., Jr., O'Neil, J.R., and Kaplan, I. (eds.), *The Geochemical Society, Special Publication No. 3*, p. 463-469.
- Constantopoulos, J., and Larson, P.B., 1991, Oxygen and hydrogen isotope geochemistry of the Star-Morning mine, Coeur d'Alene district, Idaho: *Geology*, v. 19, p. 131-134.
- Lea, D.W., Larson, P.B., Taylor, H.P., Jr., and Crawford, M.L., 1989, Oxygen isotope and fluid inclusion study of rocks from the Mineral Point area, Eureka graben, Colorado: *Economic Geology*, v. 84, p. 1656-1662.
- Larson, P.B., 1987, Stable isotope and fluid inclusion investigations of epithermal vein and porphyry molybdenum mineralization in the Rico mining district, Colorado: *Economic Geology*, v. 82, p. 2141-2157.
- Larson, P.B., and Taylor, H.P., Jr., 1987, Solfataric alteration in the San Juan Mountains, Colorado: Oxygen isotope variations in a boiling hydrothermal environment: *Economic Geology*, v. 82, p. 1019-1036.
- Larson, P.B., 1986, Progressive mineral alteration and coupled ^{18}O depletions in the Lake City hydrothermal system (23 Ma), Colorado: In *Proceedings of the Workshop on Geochemical Modeling*, Lawrence Livermore National Laboratory, California, CONF-8609134, pp. 66-71. (Not peer reviewed)
- Larson, P.B., and Taylor, H.P., Jr., 1986, An oxygen isotope study of hydrothermal alteration in the Lake City caldera, San Juan Mountains, Colorado: *Journal of Volcanology and Geothermal Research*, v. 30, p. 47-82.

- Larson, P.B., and Taylor, H.P., Jr., 1986, An oxygen study of water/rock interaction in the granite of Cataract Gulch, western San Juan Mountains, Colorado: Geological Society of America Bulletin, v. 97, p. 505-515.
- Larson, P.B., and Taylor, H.P., Jr., 1986, $^{18}\text{O}/^{16}\text{O}$ ratios in ash-flow tuffs and lavas erupted from the central Nevada caldera complex and the central San Juan caldera complex, Colorado: Contributions to Mineralogy and Petrology, v. 92, p. 146-156.
- Larson, P.B., 1984, Geochemistry of the Alteration Pipe at the Bruce Cu-Zn Volcanogenic Massive Sulfide Deposit, Arizona: Economic Geology, v. 79, p. 1880-1896.
- Shapiro, M.H., Melvin, J.D., Tombrello, T.A., Mendenhall, M.H., Larson, P.B., and Whitcomb, J.H., 1981, Comparison of radon monitoring techniques, the effects of thermoelastic strains on subsurface radon, and the development of a computer-operated radon-monitoring network for earthquake prediction: United States Geological Survey Open-File Report OF 81-0499, 84 p.
- Shapiro, M.H., Melvin, J.D., Tombrello, T.A., Mendenhall, M.N., Larson, P.B., and Whitcomb, J.H., 1981, Relationship of the 1979 Southern California Radon Anomaly to a Possible Regional Strain Event: Journal of Geophysical Research, v. 86, p. 1725-1730.
- Rose, W.I., Jr., Penfield, G.T., Drexler, J.W., and Larson, P.B., 1980, Geochemistry of the Andesite Flank Lavas of Three Composite Cones within the Atitlan Cauldron, Guatemala: Bulletin Volcanologique, v. 43, p. 131-153.

PROFESSIONAL PAPERS PRESENTED (With published abstract)

- Villegas, G.A., Aunan, M.M., Sorensen, A.P., C. R. Lindsey, C.R., J. P. Fairley, J.P., and P. B. Larson, P.B., 2016, Preliminary reconnaissance of West Astringent Creek Thermal Area, Yellowstone National Park [abstract]: In Eos, Transactions of the American Geophysical Union, Fall Meeting Supplement.
- Villegas, G.A., Fairley, J.P., Lindsey, C.R., Aunan, M.M., Price, A., and Larson, P.B., 2016, Quantifying error in heat flux measurements using a vertical sequence of thermocouple sensors [abstract]: Geological Society of America Abstracts with Programs, v. 48, no. 6; doi: 10.1130/abs/2016RM-276188.
- Aunan, M.M., Fairley, J.P., and Larson, P.B., 2016, Protocols for gas and vapor sampling in hydrothermal discharge areas [abstract]: Geological Society of America Abstracts with Programs, v. 48, no. 6; doi: 10.1130/abs/2016RM-276224.

- Andersen, A.K., Van Rythoven, A.D., Felsman, J.M., Neill, O.K., and Larson, P.B., 2016, Preliminary investigation of sulfide textures in carbonatite from the Bear Lodge alkaline complex, Wyoming [abstract]: Geological Society of America Abstracts with Programs, v. 48, no. 6; doi: 10.1130/abs/2016RM-276166.
- Lindsey, C.R., Aunan, M.M., Fairley, J.P., and Larson, P.B., 2016, Geostatistical characterization of fluid pathway connection in hot spring clusters in the Lower Geyser Basin, Yellowstone National Park, Wyoming [abstract]: Geological Society of America Abstracts with Programs, v. 48, no. 6; doi: 10.1130/abs/2016RM-276205.
- Lindsey, C.R., Fairley, J.P., and Larson, P.B., 2016, Using a simple analytical model to test for equipment tampering at Porcupine Hill Geyser, Yellowstone National Park, Wyoming [abstract]. Geological Society of America Annual Meeting Program with Abstracts.
- Gahagan, S.W., Wolff, J.A., Boroughs, S., and Larson, P.B., 2016, Geochemistry of rhyolites at the 'oxygen isotope step', Snake River Plain, Idaho [abstract]: Geological Society of America *Abstracts with Programs*. Vol. 48, No. 7; doi: 10.1130/abs/2016AM-287772.
- Mulvaney-Norris, J., and Larson, P., 2015, Stable isotope variability of altered sanidine feldspars within the Bear Lodge Alkaline Intrusive Complex, Wyoming: Implications for mineral exploration near a late-stage carbonatite ore body [abstract]: Abstract V21B-3038 presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.
- Lonero, A., Larson, P., and Neill, O., 2015, Mica Mountain muscovite, a new silicate hydrogen isotope standard reference material [abstract]: Abstract V23B-3134 presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.
- Price, A., Lindsey, C.R., Fairley, J.P., and Larson, P.B., 2015, Imaging Near-Surface Controls on Hot Spring Expression Using Shallow Seismic Refraction in Yellowstone National Park [abstract]: Abstract V12B-01 presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.
- Aunan, M., Lindsey, C.R., Price, A., Fairley, J.P., and Larson, P.B., 2015, Characterizing Hot Spring Connectivity Using Aqueous Geochemistry in the River Group Springs, Yellowstone NP, Wyoming [abstract]: Abstract V13C-3143 presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.

- Lindsey, C.R., Price, A., Fairley, J.P., and Larson, P.B., 2015, Calculating Hot Spring/ Atmospheric Coupling Using the Coefficient of Convective Heat Transfer [abstract]: Abstract V13C-3145 presented at 2015 Fall Meeting, AGU, San Francisco, Calif., 14-18 Dec.
- Lindsey, C.R., Price, A., Villegas, G., Fairley, J.P., and Larson, P.B., 2015, Investigating a breached fault relay ramp with shallow seismic and temperature data [abstract]: Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p.317.
- Fairley, J.P., Larson, P.B., Lindsey, C.R., Villegas, G., Aunan M.M., Nickelson, S., and Price, A., 2015, Comparing shallow ground temperatures in acid-sulfate and high-chloride, circum-neutral hydrothermal discharge areas of Yellowstone National Park, Wyoming [abstract]: Geological Society of America Abstracts with Programs. Vol. 47, No. 7, p. 115.
- Larson, P., and Pritchard, C., 2015, Mixed basalt-rhyolite complexes north of the Yellowstone Caldera, WY, USA [abstract]: Goldschmidt Abstracts, 2015, 1772. Invited
- Morgavi, D., Arzilli, F., Pritchard, C.J., Petrelli, M., Larson, P.B., Dingwell, D.B., and Perugini D., 2015, Magma Mixing and Crystallization between Basaltic and Rhyolitic Melts [abstract]: Goldschmidt Abstracts, 2015, 2194.
- Genova, D.D., Morgavi, D., Hess, K.-U., Pritchard, C., Borovkov, N., Perugini, D., Larson, P., and Dingwell, D., 2014, Raman Investigation of Magma Mingling Experiments as a Tool for Tracking the Chemical and Structural Evolution of Melt [abstract]: Abstract V41A-4760 presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
- Morgavi, D., Arzilli, F., Pritchard, C., Perugini, D., Mancini, L., Larson, P., and Dingwell, D., 2014, 3D Morphochemistry of Basaltic/Rhyolitic Mixed Eruptions Revealed Via Microanalysis and X-ray Microtomography [abstract]: Abstract V33A-4838 presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.
- McMillan, N.J., Larson, P.B., Fairley, J.P., Mulvaney-Norris, J.L., Donnelly, A., Ching, G., Lindsey, C.R., and Lubenow, B.L., 2014, Mass Flux Measurements of Hot Springs in Yellowstone National Park Using Deuterium Oxide Doping Method [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 744.
- Lubenow, B.L., Lindsey, C.R., McMillan, N.J., Myers, J.T., and Schmidt, K.L., Fairley, J.P., and Larson, P.B., 2014, Best Practices for Shallow Ground Temperature Measurements [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 120.

- Moody, A.C., Lindsey, C.R., Lubenow, B.L., Fairley, J.P., and Larson, P.B., 2014, Rain Check: Variations in the Geostatistical Structure of Ground Temperature Surveys, Yellowstone National Park, USA [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 120.
- Staffenberg, J.C., Larson, P.B., Wolff, J.A., Neill, O.K., Boroughs, S., and Lee, G.K., 2014, Geochemical Stratigraphy in the Yellowstone Lava Creek Tuff Magma Chamber: Implications for the Eruption Triggering Mechanisms from Major and Trace Element Zoning in Feldspar [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 551.
- Lindsey, C.R., Lubenow, B.L., McMillan, N.J., Jones, B.N., and Schmidt, D.L., Fairley, J.P., and Larson, P.B., 2014, Application and Refinement of Ice Box Calorimetry for Heat Flux Measurements in Diverse Thermally Active Areas [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 6, p. 120.
- Kim, J., Moon, J-W., Lee, I., Kim, Y., and Larson, P., 2014, Copper Isotope Composition of Seafloor Hydrothermal Vents in Back-Arc and Arc Settings, Western Pacific [abstract]: Goldschmidt Conference 2014 Abstracts.
- Pritchard, C.J., Larson, P.B., Morgavi, D., Perugini, D., Arzilli, F., Mancini, L., and Dingwell, D., 2014, Preliminary Field, Petrologic, Experimental Mixing and X-ray Computed Microtomography Results from the Mixed Basalt And Rhyolite Complexes along the East Gallatin-Washburn Fault Zone, Yellowstone National Park, WY, USA [abstract]: Geological Society of America Abstracts with Programs, Vol. 46, No. 5, p. 594.
- Andersen, A.K., Larson, P.B., and Clark, J.G., 2013, Rare Earth Element Zonation and Fractionation at the Bear Lodge REE Deposit, Wyoming [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 5., p. 42.
- Amrhein, K.E., Brueseke, M.E., and Larson, P.B., 2013, Testing Models of Low- $\delta^{18}\text{O}$ Silicic Magmatism in the Mid-Miocene Santa Rosa-Calico Volcanic Field, NV [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 3., p. 25.
- Morgavi, D., Perugini, D., Pritchard, C.J., De Campos, C.P., Larson, P.B., and Dingwell, D.B., 2013, Experimental Constraints on Mixing between Basaltic and Rhyolitic Magmas [abstract]: International Association of Volcanology and Chemistry of the Earth's Interior (IAVCEI), Scientific Assembly, July, 2013, Kagoshima, Japan. Paper no. 4W ID-P18.
- Amrhein, K.E., Brueseke, M.E., and Larson, P.B., 2013, Isotope Constraints on Mid-Miocene Rhyolite Production in the Santa Rosa-Calico Volcanic Field, NV [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 7., p. 499.

- Andersen, A.K., Cosca, M.A., and Larson, P.B., 2013, Timing of Carbonatite Magmatism in the Bear Lodge Alkaline Complex, WY [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 7., p. 499.
- Andersen, A.K., Van Rythoven, A.D., Clark, J.G., and Larson P.B., 2013, Economic REE Distribution at the Bear Lodge Deposit, WY [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 7., p. 500.
- Majewski, D.J., Rowe, M.C., and Larson, P.B., 2013, Hydrous Mineral Chemistry of the Elkhead Mountains in NW Colorado: Insights into Mantle Sources and Magmatic Processes [abstract]: Geological Society of America Abstracts with Programs, Vol. 45, No. 7., p. 603.
- Andersen, A.K., Larson, P.B., and Rowe, M.C., 2013, REE Fractionation at the Bear Lodge REE+Au Deposit, USA: Evidence from Mineral Chemistry [abstract]: Mineralogical Magazine, Goldschmidt2013 Conference Abstracts, DOI:10.1180/minmag.2013.077.5.12, p. 592.
- Larson, P.B., 2013, Alteration and Fluid Flow in Large Continental Hydrothermal Systems [abstract – invited]: Mineralogical Magazine, Goldschmidt2013 Conference Abstracts, DOI:10.1180/minmag.2013.077.5.12, p. 592.
- Lonero, A., and Larson, P.B., 2013, Hydrothermal Alteration and Stable Isotope Ratios of the Sulfur Creek Tuff; A Window into the Subsurface Environment of the Yellowstone Caldera in Yellowstone National Park, WY [abstract]: Abstract V33E-2827 presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
- Schleiffarth, W.K., and Larson, P.B., 2013, Petrogenesis of Challis Volcanic Group, East-Central Idaho [abstract]: Abstract V51C-2679 presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
- Meek, T., Brueseke, M., Larson, P., and Hasten, Z., 2012, Oxygen isotope constraints on Mid-Miocene magma production in the Owyhee Mountains USA [abstract]: Geological Society of America Abstracts with Programs, Vol. 44, No. 7, p. 249.
- Majewski, D., Rowe, M., and Larson, P.B., 2012, Unraveling alkalic magmatism of the Jemez lineament: Interpretations from hydrous mineral geochemistry at Two Buttes, Colorado [abstract]: Geological Society of America Abstracts with Programs, Vol. 44, No. 6, p. 16.
- Larson, P., Pritchard, C., 2011, Geochemical changes due to propylitization in the Eocene Sawtooth ring zone, Idaho batholith, USA [abstract]: Geological Society of America Abstracts with Programs, Vol. 43, p. 634.

- Boroughs S., Wolff, J., Ellis, B., Bonnicksen, B., and Larson, P., 2011, O rhyolite production in the central Snake River Plain [abstract]: Geological Society of America Abstracts with Programs, Vol. 43, p. 652.
- Pritchard C., Ellis, B., Larson, P., and Mark, D., 2011, New high precision $^{40}\text{Ar}/^{39}\text{Ar}$ measurements of the Huckleberry Ridge tuff: Member C – a caldera-forming, post-collapse rhyolite, Yellowstone, WY, USA [abstract]: Geological Society of America Abstracts with Programs, Vol. 43 ,p. 652.
- Tarbert, K., and Larson, P.B., 2010, Archean orthogneiss lithologies of Northern Yellowstone National Park and their geochemical contribution to the younger rhyolites [abstract]: Abstract V23B-2401 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Pritchard, C.J., and Larson, P.B., 2010, Isotopic modeling and the formation of the post-caldera eastern Upper Basin Member rhyolites, Yellowstone, WY [abstract]: Abstract V23B-2403 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.
- Callicoaat, J., Brueseke, M., and Larson, P.B., 2010, Oxygen isotope constraints on voluminous mid-Miocene effusive silicic magmatism in north-central Nevada [abstract]: Geological Society of America Abstracts with Programs, Vol. 42, No. 4, p. 105.
- Tarbert, K.D., and Larson, P.B., 2010, Preliminary geochemistry of samples from Yellowstone National Park [abstract]: Geological Society of America Abstracts with Programs, Vol. 42, No. 3, p. 49.
- Mallory, M., Holk, G.J., Larson, P.B., and Cochrane, M., 2010, A stable isotope and petrogenetic study of the alkaline Penticton group volcanic suite: the White Lake basin, south-central British Columbia, Canada [abstract]: Geological Society of America Abstracts with Programs, Vol. 42, No. 4, p. 105.
- Phillips, A.R., Larson, P., and John, D.A., 2009, Characterizing ancient hydrothermal systems of Sevenmile Hole in the Grand Canyon of the Yellowstone River, Yellowstone National Park, with mineralogy, stable isotopes, and fluid inclusions [abstract]: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 87.
- Sisson, T.W., Salters, V.J., Larson, P., and Rye, R.O., 2009, Geochemical and isotopic evidence for differentiation and assimilation in the origin of Mount Rainier's calc-alkaline andesitic suite [abstract]: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 191.
- Watts, K.E., Leeman, W.P., Bindeman, I.N., and Larson, P., 2009, Oxygen isotope study of Archean xenoliths constrains the source of supervolcanic rhyolites in

- the Snake River Plain-Yellowstone plateau volcanic province [abstract]: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 139.
- Manion, J.L., and Larson, P., 2009, Older hydrothermal activity along the northern Yellowstone caldera margin at Sulphur Creek, Yellowstone Park, Wyoming [abstract]: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 525.
- Pritchard, C.J., Larson, P., and Hart, G., 2009, Variable source rocks for low oxygen isotope rhyolites of the eastern Upper Basin member of the Plateau rhyolites, Yellowstone Caldera, WY [abstract]: Geological Society of America Abstracts with Programs, Vol. 41, No. 7, p. 139.
- Gaspar, M., Relvas, J., Carvalho, J., Larson, P., Hart, G., Pinto, A., Pacheco, N. 2008, Cu Isotopic variation in the Neves-Corvo deposit, Iberian Pyrite Belt [abstract]: *Geochimica et Cosmochimica Acta*, Volume 72, Issue 12, Supplement 1, p. A299.
- Larson, P., Phillips, A., John, D., Cosca, M., Pritchard, C., Andersen, A., Manion, J. 2008, Older Hydrothermal Alteration in the Yellowstone Caldera, Wyoming [abstract]: *Geochimica et Cosmochimica Acta*, Volume 72, Issue 12, Supplement 1, p. A518.
- Manion, J., and Larson, P., 2008, Older hydrothermal activity along the northern Yellowstone Caldera margin at Sulphur Creek, Yellowstone Park, Wyoming [abstract]: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract V11A-2002.
- Phillips, A., Larson, P., John, D., Pauley, B., 2008, Hydrothermal quartz oxygen isotope ratios in altered post-collapse rhyolite at Sevenmile Hole, Grand Canyon of the Yellowstone River, Yellowstone National Park, WY [abstract]: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract V11A-2017.
- Pritchard, C., and Larson, P., 2008, Evolution of eastern Upper Basin member rhyolites, Yellowstone Caldera, WY [abstract]: *Eos Trans. AGU*, 89(53), Fall Meet. Suppl., Abstract V21C-2115.
- Giles, A., Wolff, J., Larson, P., Urbanzyk, K., 2008, Two types of high-grade ignimbrite? A comparison between rhyolites of the Trans-Pecos Texas and central Snake River Plain volcanic fields [abstract]: Geological Society of America Abstracts with Programs, Vol. 40, no.3, p. 11.
- Phillips, A., Larson, P., John, D., Cosca, M., Pauley, B., Manion, J., Pritchard, C., and Andersen, A., 2007, Distribution of Hydrothermal Mineral Assemblages in the Sevenmile Hole Area, Grand Canyon of the Yellowstone River, Yellowstone National Park, Wyoming [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.

- Boroughs, S., Wolff, J., Bonnicksen, B., and Larson, P., 2007, Isotope variations along the Yellowstone hotspot trace: can a single model explain it all? [abstract]: Geological Society of America Annual Meeting, Denver.
- Takeuchi, A., and Larson, P.B., 2006, A link between topography and volcanism in the Oregon Cascade Range [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.
- Larson, P.B., Cosca, M., Takeuchi, A., and Yano, R., 2006, Older shallow hydrothermal alteration along the north edge of the Yellowstone Caldera [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.
- Boroughs, S., Bonnicksen, B., Wolff, J., Bodchaux, M., and Larson, P., 2006, How much ^{18}O -depleted rhyolite in the Snake River Plain? [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.
- Larson, P.B., and Marsh, B., 2005, Oxygen isotopes of orthopyroxene and plagioclase from the Dais Layered Intrusion of the Ferrar Dolerite magmatic system; McMurdo Dry Valleys, Antarctica [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.
- Takeuchi, A., and Larson, P.B., 2005, Longitudinal variation in terrestrial oxygen isotope records of modern water and mid-Miocene authigenic minerals: No mid-Miocene climatic optimum in the inland Pacific Northwest? [abstract]: American Geophysical Union Annual Fall Meeting, San Francisco.
- Maher, K.C., Wood, S., and Larson, P., 2005, Causes of variations in copper isotope ratios in the porphyry/skarn ore environment: sources or processes? [abstract]: Geological Society of America Annual Meeting, Salt Lake City.
- Cole, D.R., Labotka, T.C., Larson, P.B., More, K.L., Kenik, E.A., Fayek, M., Stadermann, F.J., and Riciputi, L.R., 2005, Mineral reaction interfaces and associated porosity generation [abstract]: Abstracts of the 15th V.M. Goldschmidt Conference, *Geochimica et Cosmochimica Acta*, v. 69, p. A169.
- Maher, K.C., and Larson, P.B., 2005, Copper isotope fractionation at high temperature: Investigating copper mineralization at Corocchohuayco, Peru [abstract]: Abstracts of the 15th V.M. Goldschmidt Conference, *Geochimica et Cosmochimica Acta*, v. 69, p. A212.
- Hickes, H.J., Larson, P.B., Wolff, J.A., and Vervoort, J.D., 2005, Sr-Nd-Pb-O isotope geochemistry of a Quaternary, caldera-forming, phonolitic eruptive sequence; The Deigo Hernandez Formation, Tenerife, Canary

- Islands (Spain) [abstract]: Abstracts of the 15th V.M. Goldschmidt Conference, *Geochimica et Cosmochimica Acta*, v. 69, p. A242.
- Lee, R.B., Larson, P.B., and Vervoort, J.D., 2005, Genesis of a tonalite-trondhjemite suite within the accreted terrane, north-central Idaho [abstract]: Abstracts of the 15th V.M. Goldschmidt Conference, *Geochimica et Cosmochimica Acta*, v. 69, p. A248.
- Sha, G. S., Vervoort, J.D., Watkinson, A.J., Doughty, P.T., Prytulak, J., Lee, R. G., and Larson, P.B., 2004, Geochronologic constraints on the tectonic evolution of the Boehls Butte-Clearwater core complex: evidence from 1.01 ga garnets [abstract]: Geological Society of America Abstracts with Programs, v. 35, no. 4, p. 72.
- Boroughs, S., Wolff, J., Bonnicksen, B., Godchaux, M., and Larson, P., 2004, Large volume low $\delta^{18}\text{O}$ rhyolites in the Bruneau-Jarbidge volcanic center: evidence for large scale melting of hydrothermally altered crust? [abstract]: Geological Society of America Abstracts with Programs, v. 35, no. 4, p. 24.
- Lee, R., Larson, P., Vervoort, J., and Knaack, C., 2004, Zircon laser ablation u-pb ages from the suture zone and Idaho Batholith near Kamiah, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 36, no. 4, p. 75.
- Hickes, H.J., Larson, P.B., Wolff, J.A., Vervoort, J.D., 2004, Evaluating the role of crustal interaction with mantle-derived magmas: Sr-Nd-O isotope geochemistry of a Quaternary, caldera-forming, phonolitic eruptive sequence; the Diego Hernandez Formation, Tenerife, Canary Islands (Spain) [abstract]: *Eos*, Fall meeting supplement, v. 85, pp. ?.
- Hickes, H.J., Larson, P.B., Wolff, J.A., and Olin, P.H., 2003, Oxygen isotope variation within a Quaternary, caldera-forming, phonolitic eruptive sequence: the Diego Hernández Formation, Tenerife, Canary Islands, Spain [abstract]: *Eos*, Fall meeting supplement, v. 84, p. F1488.
- Boroughs, S., Wolff, J., Bonnicksen, B., Godchaux, M.M., and Larson, P.B., 2003, Large volume ^{18}O -depleted rhyolitic volcanism: the Bruneau-Jarbidge volcanic field, Idaho [abstract]: *Eos*, Fall meeting supplement, v. 84, pp. F1650-1651.
- Boroughs, S., Wolff, J.A., Bonnicksen, B., Godchaux, M.M., and Larson, P.B., 2003, Large-scale low $\delta^{18}\text{O}$ rhyolitic volcanism: the Bruneau-Jarbidge volcanic field, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 34, p. 183.

- Larson, P.B., Ramos, F.C., Maher, K., 2003, Copper isotope variations in magmatic and hydrothermal ore deposits [abstract]: Geological Society of America Abstracts with Programs, v. 34, p. 357. *invited*
- Takeuchi, A., and Larson, P.B., 2003, Oxygen isotope evidence for the rapid late Miocene development of the rain shadow on the east side of the Washington Cascade Range [abstract]: Geological Society of America Abstracts with Programs, v. 34, p. 307. *invited*
- Lee, R.L., and Larson, P.B., 2003, Magmatic assimilation of oceanic sediments in the Wallowa-Seven Devils accreted terrane, north-central Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 34, p. 555.
- Maher, K.C., Ramos, F.C., and Larson, P.B., 2003, Copper isotope characteristics of the Cu (+Au, Ag) skarn at Coroccohuayco, Peru [abstract]: Geological Society of America Abstracts with Programs, v. 34, p. 518.
- Hickes, H.J., Larson, P.B., Wolff, J.A. and Olin, P.H., 2002, Evidence for extremely shallow-level assimilation of phonolitic pumice by basaltic magma, Diego Hernandez Formation, Tenerife, Canary Islands, Spain [abstract]: Eos, Fall meeting supplement, v. 83. p. F1431.
- Maher, K.C., Larson, P.B., Ramos, F.C., Gaspar, M., and Chang, Z., 2002, Insights into ore deposit genesis using copper isotopes [abstract]: Eos, Fall meeting supplement, v. 83. p. F1499.
- Larson, P.B., Ramos, F.C., Maher, K., Gaspar, M., Chang, Z., Meinert, L.D., and Wolff, J.A., 2002, Cu isotopes: tracing metal sources in ore deposits [abstract]: Geochimica et Cosmochimica Acta, Abstracts of the 12th Annual V.M. Goldschmidt Conference, v. 66, p. A433.
- Nichols, H.J., Wolff, J.A., Larson, P.B., Pittari, A., Edgar, C.J., Cas, R.A.F. and Martí, J., 2001, The complex history of a caldera-forming magma: the El Abrigo ignimbrite, Tenerife, Canary Islands [abstract]: Eos, Fall meeting supplement, v. 82, p. F1380.
- Larson, P.B., Nichols, H.N., Wolff, J.A. and Martí, J., 2001, O and H isotope ratios of syenite blocks in the El Abrigo ignimbrite, Tenerife, Canary Islands: a hydrothermal fingerprint for assimilation [abstract]: Eos, Fall meeting supplement, v. 82, p. F1290.
- Larson, P.B., Robertson, M.C., Reppe, T.H., Mitchell, T.A., Geist, D.J., and Hawkesworthe, C.J., 2000, Crustal sources for Eocene intrusions in central Idaho: Sr, Nd, Pb, and O isotope constraints [abstract]: Geological Society of America Abstracts with Programs, v. 32, no. 6, p. 23. *invited*

- Cole, D.R., Larson, P.B., and Riciputi, L.R., 2000, Time estimates of hydrothermal fluid-mineral interaction controlled by coupled reaction-diffusion at the microscopic scale [abstract]: Geological Society of America Abstracts with Programs, v. 32, no. 7, p. 290.
- Larson, P.B., Grandy, J.S., Wolff, J.A., Marti, J., and Sharp, Z.D., 2000, Trace element and oxygen isotopic modification of ocean island basalts by crustal assimilation: Tenerife, Canary Islands [abstract]: Geological Society of America Abstracts with Programs, v. 32, no. 7, p. 323.
- Driver, L.A., Larson, P.B., and Hawkesworth, C.J., 1999, Crustal source signatures in mid-Cretaceous magmas in the Kootenai Arc: O, Sr, and Nd isotope ratios in the Spirit Pluton, NE Washington, USA [abstract]: Geological Society of America Abstracts with Programs, v. 31, no. 7, p. 414.
- Grandy, J. S., Wolff, J. A., and Larson, P. B., 1998, Interaction of ocean island magma and hydrothermally altered crust, Tenerife, Canary Islands [abstract], Eos, Transactions supplement, v. 79, p F943-944.
- Larson, P.B., and Wolff, J.A., 1998, Trace element and oxygen isotope geochemistry of phonolitic pumice deposits from the Guajara and Diego Hernandez Formations: Fractional crystallization vs. assimilation of nepheline syenite [abstract]: Evolution of Ocean Island Volcanoes, Geological Society of America Penrose Conference Program and Abstract Volume, p. 54.
- Riciputi, L.R., Cole, D.R., Larson, P.B., and Mora, C.I., 1998, A SIMS investigation of chemical and oxygen isotope exchange associated with syntaxial feldspar replacement in the Rico Dome, Co. [abstract]: Geological Society of America Abstracts with Programs, v. 30, no. 6, p. 271.
- Wolff, J.A., and Larson, P.B., 1998, Trace element and oxygen isotope geochemistry of phonolitic pumice deposits from the Guajara and Diego Hernandez Formations: Fractional crystallization vs. assimilation of nepheline syenite [abstract]: The Geology and Geophysics of Tenerife, Workshop abstracts, p. 39.
- Ball, J.B., Keller, C.K., and Larson, P.B., 1997, Stable isotopes in the hydrosphere of southeastern Washington-Part I. Measuring d¹⁸O of water in the vadose zone [abstract]:The 2nd Symposium on the Hydrogeology of Washington State, abstracts p. 57.
- Mitchell, T.A., and Larson, P.B., 1997, Rare earth element and isotopic constraints on magma genesis and source region of the Big Smoky Creek stock, central Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 29, no. 6, p. 455-456.

- Reppe, T.H., and Larson, P.B., 1997, Radiogenic and stable isotope evidence for the origin of the Eocene Prairie Creek stock, Blaine and Camas Counties, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 29, no. 6, p. 456.
- Larson, P.B., 1997, Coupled plagioclase exchange reactions in a natural hydrothermal system: Seventh Annual V.M. Goldschmidt Conference, p. 122.
- Rosenberg, P.E., and Larson, P.B., 1997, Isotope geochemistry of quartz-carbonate veins associated with the Coeur d'Alene mineralization: Seventh Annual V.M. Goldschmidt Conference, pp. 179-180.
- Rosenberg, P.E., and Larson, P.B., 1996, The age of quartz-carbonate veins associated with the Coeur d'Alene mineralization [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. 475.
- Larson, P.B., Meuzelaar, T., and Cunningham, C.G., 1996, Contemporaneous epithermal Ag-Pb-Zn vein and stockwork Mo mineralization at Rico, CO [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. 403.
- Robertson, M.C., and Larson, P.B., 1996, Trace element and Pb isotopic constraints on magma genesis in the Eocene Boulder Mountain stock, central Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. 420.
- Larson, K.R., Keller, C., Allen-King, R.M., Larson, P.B., and Hathorn, W.E., 1996, A stable isotope study of the water budget of a basalt aquifer system [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 7, p. 198.
- Geist, D., Jellinek, M., and Larson, P., 1996, Infra- to supra-structure of a granite-rhyolite magmatic system, Challis Volcanic Field, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 5, p. 68.
- Conrey, R.M., Hooper, P.R., Larson, P.B., Chesley, J., and Ruiz, J., 1996, Trace element and isotopic evidence for two types of crustal melting beneath a high Cascade volcanic center, Mt. Jefferson, OR [abstract]: Geological Society of America Abstracts with Programs, v. 28, no. 5, p. 57.
- Larson, P.B., Cunningham, C.G., Meuzelaar, T., and Naeser, C.W., 1995, Heated ground water formed paleothermal anomaly around major Mo and Ag deposits near Rico, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 46, no. 6, p. 313. *Invited*

- Larson, P.B., and Geist, D.J., 1995, Assimilation and the origin of low-¹⁸O magmas: Evidence from the Eocene Casto pluton, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 27, p. A-46.
- Larson, P.B., Cunningham, C.G., Meuzelaar, T., and Naeser, C.W., 1995, Heated ground water formed paleothermal anomaly around major Mo and Ag deposits near Rico, Colorado [abstract]: Geological Society of America Abstracts with Programs (Annual National Meeting, New Orleans), v. 27, p. A-313.
- Meuzelaar, T., Larson, P.B., and Cunningham, C.G., 1995, Metasomatism and isotope exchange within the mineralized sedimentary rocks, Rico, Co [abstract]: Geological Society of America Abstracts with Programs, v. 27, no.4, p 47.
- Lowe, C.H., and Larson, P.B., 1995, Geology and mineralization of the Key East gold deposit, Ferry County, WA [abstract]: Geological Society of America Abstracts with Programs, v. 27, no.4, p. 44.
- White, C.M., Larson, P.B., and Hart, W.K., 1995, Petrology of the Graveyard Point sill, a differentiated tholeiitic intrusion at the northern edge of the Basin and Range province, Oregon [abstract]: 1995 IGCP Project 336, Proceedings, Duluth, MN, pp. 205-206.
- Marchev, P., Larson, P., Rogers, G., Vaselli, O., and Raicheva, R., 1994, Crustal thickness (CT) control on the Sr, Nd, and O isotopic variation in the Macedonian-Rhodope-North Aegean magmatic belt (MRNAMB) [abstract]: International Volcanological Congress Abstracts, Ankara, Turkey (no page numbers in volume).
- Marshall, J., Zhang, J., Rember, W.C., Jennings, D., and Larson, P., 1994, Stable carbon isotope ratios and intrinsic water-use efficiency of Miocene fossil leaves compared to modern congeners [abstract]: Ecological Society of America Annual Meeting Abstracts, v. 75.
- Rosenberg, P.E., and Larson P.B., 1994, Snowbird-type quartz carbonate deposits, western Montana [abstract]: Geological Society of America Abstracts with Programs, v. 26, p. 310.
- Larson, P.B., 1993, Alteration in a large, 4 Ma, mineralized hydrothermal system: mineralogy, stable isotopes, and mass exchange in an upwelling fossil goothermal plume at Rico, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 25, p. 67.
- Geist, D., Howard, K., and Larson, P., 1992, Crystal-fractionation origin for a bimodal tholeiite-rhyolite volcano: Volcan Alcedo, Galapagos: EOS, Transactions American Geophysical Union, Fall Meeting Abstracts, v. 73,

p. 622-3.

- Zimmerman, B.S., Myers, G.L., Meinert, L.D., and Larson, P.B., 1992, Stable isotope evidence for magmatic fluid dominance in the Fortitude gold skarn deposit, Lander County, Nevada [abstract]: Geological Society of America Abstracts with Programs, v. 24, p. 144-5.
- Larson, P.B., Cunningham, C.G., and Naeser, C.W., 1992, Large scale effects of hydrothermal alteration in the Rico paleothermal anomaly, southwest Colorado, U.S.A.: 29th International Geological Congress Abstracts, Kyoto, Japan, v. 3, p. 768. *Invited*
- Larson, P.B., 1992, Large-scale effects of hydrothermal alteration in the Rico paleothermal anomaly, Colorado: Annual Pacific Northwest Mining and Metals Conference, Abs. with Prog., p. 17. *Invited*
- Larson, P.B., Cunningham, C.G., and Naeser, C.W., 1991, Oxygen isotope and water / rock ratio variations in the Rico paleothermal anomaly, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 23, p. 293-294.
- Larson, P.B., Zimmerman, B.S., Cunningham, C.G., and Naeser, C.W., 1991, Geochemical and thermal gradients in the 4 Ma Rico paleothermal anomaly, Colorado: Effects of a continental convective hydrothermal plume. Pacific Northwest Amer. Geophys. Union Abstract Volume with Meeting Program, p. 22.
- Larson, P.B., Zimmerman, B.S., Cunningham, C.G., and Naeser, C.W., 1991, Large-scale alteration effects in the Rico paleothermal anomaly, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 23, p. 40.
- Criss, R.E., Larson, P.B., and Taylor, H.P., Jr., 1990, Implications of $^{18}\text{O}/^{16}\text{O}$ and D/H data on hydrothermally altered terranes to the deep-level and long-term characteristics of caldera-related hydrothermal systems [abstract]: EOS, Transactions American Geophysical Union, Fall Meeting Abstracts, v. 71, p. 1677. *Invited*.
- Larson, P.B., Zimmerman, B.S., and Cunningham, C.G., 1990, Mass flux and hydrothermal reactions in the hornblende latite porphyry, Rico paleothermal anomaly, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 22, p. 181.
- Zimmerman, B.S., and Larson, P.B., 1990, Gold mineralization in a Miocene hot spring system, Red Butte, Oregon [abstract]: Geological Society of America Abstracts with Programs, v. 22, p. 52.

- Zimmerman, B.S., and Larson, P.B., 1989, Epithermal gold mineralization on Indian Head Mountain, Washington County, Idaho [abstract]: Geological Society of America Abstracts with Programs, v. 21, p. 163.
- Larson, P.B., 1987, Geology and oxygen isotope geochemistry of the Bruce volcanogenic massive sulfide deposit, Bagdad, Arizona [abstract]: Geological Society of America Abstracts with Programs, v. 19, p. 740. Invited.
- Cunningham, C.G., Naeser, C.W., Cameron, D.E., Barrett, L.F., Wilson, J.C., and Larson, P.B., 1987, The Pliocene paleothermal anomaly at Rico, Colorado as related to a major molybdenum deposit [abstract]: Geological Society of America Abstracts with Programs, v. 19, p. 268-269. Invited.
- Brooks, J.W., and Larson, P.B., 1987, Oxygen and hydrogen isotopes as an exploration tool in the epithermal environment: example from the Mammoth Revenue vein, Platoro caldera, San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 19, p. 362. Invited.
- Larson, P.B., and Bloom, J.G., 1987, K-Ar alteration ages in the Mineral Point District, Eureka graben area, western San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 19, p. 313. Invited.
- Larson, P.B., and Taylor, H.P., Jr., 1987, Oxygen isotope variations in Tertiary solfataric deposits, San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 19, p. 397-398. Invited.
- Larson, P.B., 1986, Progressive mineral alteration and oxygen isotope depletions in the Lake City hydrothermal system (23 Ma), Colorado: Collected abstracts for the Workshop on Geochemical Modeling, Fallen Leaf Lake, California (sponsored by the Lawrence Livermore National Laboratory, Nuclear Waste Management Projects).
- Larson, P.B., Bailey, K.H., and Taylor, H.P., Jr., 1986, Oxygen isotope evidence for two distinct fluid sources in the Rico mining district, southwest Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 18, p. 390.
- Bailey, K.H., and Larson, P.B., 1986, Magmatic sulfide minerals in the Ferrar dolerite, South Victoria Land, Antarctica [abstract]: Geological Society of America Abstracts with Programs, v. 18, p. 532.
- Brooks, J.W., Larson, P.B., and O'Neil, J.R., 1986, Paragenesis and fluid characteristics of the Mammoth Revenue vein, Platoro caldera, San Juan

- Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs v. 18, p. 550.
- Neal, W.S., and Larson, P.B., 1986, Mineral and fluid geochemistry of the Hoosier vein, Chloride mining district, New Mexico [abstract]: Geological Society of America Abstracts with Programs, v. 18, p. 703.
- Larson, P.B., and Taylor, Jr., H.P., 1984, $^{18}\text{O}/^{16}\text{O}$ relationships in Tertiary ash flow tuffs from complex caldera structures in northern Nye County, Nevada, and the Central San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 16, p. 569.
- Lea, D.W., Larson, P.B., and Taylor, Jr., H.P., 1984, Oxygen isotope and fluid inclusion study of veins and wall rocks in the Eureka graben, San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 16, p. 572.
- Larson, P.B., and Taylor, Jr., H.P., 1983, Hydrothermal fluid flow patterns associated with resurgent doming of the 23 m.y.-old Lake City caldera, San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 15, p. 623.
- Larson, P.B., and Taylor, Jr., H.P., 1982, $^{18}\text{O}/^{16}\text{O}$ relationships in hydrothermally altered rocks of the 22.5 m.y. Lake City caldera, San Juan Mountains, Colorado [abstract]: Geological Society of America Abstracts with Programs, v. 14, p. 541.
- Larson, P.B., 1977, The chemistry and mineralogy of the alteration "pipe" of the Pre-cambrian Bruce volcanogenic massive sulfide deposit, Yavapai County, Arizona: Geological Association of Canada National Meeting, Abstracts with Programs, v. 2, p. 31.
- Larson, P.B., and Rose, Jr., W.I., 1974, Chemistry of andesites from Toliman and Atitlan Volcanoes, Guatemala: Eos, Fall meeting supplement, v. 55, p. 487.

PROFESSIONAL PAPERS PRESENTED (Without published abstract)

- Larson, P.B., 2009, The geochemistry of hydrothermally altered rocks in calderas: Constraints on the sources of low- ^{18}O magmas: Geological Society of America Penrose Conference, "Low $\delta^{18}\text{O}$ rhyolites and crustal melting: Growth and redistribution of the continental crust" (Invited).
- Larson, P.B., 2004, The duration of and fluid sources for mass and thermal transport in the Rico hydrothermal system, Colorado: Geological Society of America Penrose Conference, "Mass redistribution in Continental Magmatic-Hydrothermal Systems", 6-11 September, Yellowstone NP, WY, and Butte, MT.

Larson, P.B., 1995, Oxygen isotope ratios in the Casto Puton, Idaho: An isotopically zoned low-¹⁸O magma: Symposium for Leon T. Silver, California Institute of Technology, Pasadena.

Larson, P.B., 1993, Mass and fluid flux and hydrothermal reactions in the hornblende latite porphyry, Rico paleothermal anomaly, Colorado: Gordon Research Conference on Inorganic Geochemistry of Hydrothermal Ore Deposits (Invited).

Larson, P.B., 1992, Mass and fluid flux and hydrothermal reactions in the hornblende latite porphyry, Rico paleothermal anomaly, Colorado: Fluid-Volcano Interactions: Geological Society of America, Penrose Conference (Invited).

Larson, P.B., 1982, Oxygen isotope studies of the Lake City hydrothermal system, Colorado: Fluid Sources: Society of Economic Geologists Field Conference (Invited).

Larson, P.B., 1982, Oxygen isotope studies of the Lake City hydrothermal system, Colorado: Fluid Sources: Geological Society of America, Penrose Conference (Invited).

GRADUATE STUDENTS UNDER MY DIRECTION

Sorenson, Anthony, M.S. thesis anticipated May, 2018

Khan, A., Ph.D., dissertation anticipated May, 2017

Ching, Gilbert, M.S. thesis anticipated May, 2017

Hasten, Amber, M.S. thesis anticipated May, 2017

Mulvaney-Norris, J., M.S. thesis anticipated May, 2017

McKinley, R.J.P., M.S. 2016, Geochemical and isotopic analysis of the alteration mineralogy and zoning of the K5 epithermal gold deposit, Ferry County, Washington: M.S. thesis, Washington State University, 141 p.

McMillan, Nick, M.S., 2015, Mass and heat transfer measurements of hot springs in Yellowstone National Park using deuterium oxide doping method: M.S. thesis, Washington State University, 115 p.

Staffenberg, J., M.S., 2015, Spatiotemporal evolution of the Lava Creek Tuff magma chamber in Yellowstone National Park: Eruption triggering mechanisms from major and trace element zoning in feldspar: M.S. thesis, Washington State University, 201 p.

- Andersen, A., Ph.D, 2015, Rare-earth fractionation and mineralization during hydrothermal and supergene modifications of a carbonatite stockwork in the Bear Lodge Alkalic Complex, Wyoming: Ph.D. dissertation, Washington State Univeristy, 267 p.
- Lonero, A., M.S., 2015, Hydrothermal minerals and stable isotope ratios at Sevenmile Hole: A window into the subsurface hydrothermal environment of the Yellowstone Caldera, WY: M.S. thesis, Washington State University, 159 p.
- Schlieffarth, K., M.S., 2013, Geology and Geochemistry of the Challis Volcanic Group within the Ellis and Ennis Gulch Quadrangles, East-Central Idaho: Petrogenesis of the Eocene Challis-Kamloops Volcanic Belt: M.S. thesis, Washington State University, 80 pages.
- Tarbert, K., 2011, Geochemical analysis of Archean lithologies, Yellowstone National Park, WY: M.S. thesis, Washington State University, 146 pages.
- Pritchard, C., 2011, Post-caldera volcanism in Yellowstone National Park: Petrogenesis of the intracaldera Upper Basin member of the Plateau Rhyolite and extra-caldera mingled magma complexes: Ph.D. dissertation, Washington State University, 334 pages.
- Manion, J.L., 2010, Epithermal alteration in Tuff of Sulphur Creek, Yellowstone National Park, Wyoming: M.S. thesis, Washington State University, 472 pages.
- Andersen, A.K., 2010, Geochemistry of Inkpot Spring, Sulphur Creek-Sevenmile Hole area, Yellowstone Caldera, Wyoming: M.S. thesis, Washington State University, 159 pages.
- Phillips, A.R., 2010, An oxygen isotope, fluid inclusion, and minerology study of the ancient hydrothermal alteration in the Grand Canyon of the Yellowstone River, Yellowstone National Park, Wyoming: M.S. thesis, Washington State University, 132 pages.
- Takeuchi, A., 2007, Decoupling the ancient hydrologic system from the modern hydrologic system of Pacific northwest in the United States: Implications for the evolution of topography, climate, and environment: Ph.D. dissertation, Washington State University, 248 pages.
- Maher, K.C., 2005, Analysis of copper isotope ratios by multi-collector inductively coupled plasma mass spectrometry and interpretation of copper isotope ratios from copper mineralization: Ph.D. dissertation, Washington State University, 239 pages.

- Lee, R.G., 2004, The geochemistry, stable isotope composition, and U-Pb geochronology of tonalite trondhjemites within the accreted terrane, near Greer, north-central Idaho: M.S. thesis, Washington State University, 132 pages.
- Takeuchi, A., 2003, The stable isotopic composition of autigenic and pedogenic minerals from paleosols in eastern Washington as markers for climatic change in response to Cascade range barriers: M.S. thesis, Washington State University, 117 pages.
- Thompson, J., 2001, An Oxygen Isotope Investigation of Hydrothermal Alteration in the Castle Mountain Mining District, Montana, M.S. thesis, Washington State University, 78 pages.
- Grandy, J., 2000, Multiple Assimilants in Ocean Island Magma: O Isotope and Trace Element Evidence from Tenerife, Canary Islands, M.S. thesis, Washington State University, 54 pages.
- Bradshaw, R., 2000, A Stable Isotope Investigation of Metamorphic Fluid Flow in the Region around Conrad Peak and Thor Mountain, Idaho, M.S. thesis, Washington State University, 105 pages.
- Ott, A., 1999, Detailed Stratigraphy and Stable Isotope Analysis of the Claron Formation, Bryce Canyon National Park, Southwestern Utah, M.S. thesis, 130 pages.
- Lowe, C., 1998, Geology of the Key East Gold Deposit, Ferry County, Washington. M.S. thesis, 431 pages.
- Mitchell, T., 1997, Petrology, Geochemistry, and Petrogenesis of the Eocene Big Smoky Creek Stock, South-central Idaho. M.S. thesis, 147 pages.
- Reppe, T., 1997, Geology, Geochemistry, and Petrogenesis of the Eocene Prarie Creek Stock, Smoky Mountains, Blaine and Camas Counties, Idaho. M.S. thesis, 221 pages.
- Robertson, M.C., 1997, Geochemistry and petrogenesis of the Eocene Boulder Mountain Stock, central Idaho: M.S. thesis, 197 pages.
- Meuzelaar, T., 1996, Metasomatism and oxygen isotope exchange within hydrothermally-altered sedimentary rocks, Rico, Colorado. M.S. thesis, 194 pages.
- Brooks, J.W., 1994, Petrology and geochemistry of the McCoy Gold Skarn, Lander County, Nevada. Ph.D. dissertation, 607 pages.
- Trachte, C.B., 1993, Geochemical Study of the Copper Vein, Sunshine Mine, Kellogg,

- Idaho. M.S. thesis, 102 pages.
- Sampson, T.R., 1993, Alteration and structural paragenetic relationships; emphasis on Mesozoic imbricate thrust faults, Goldstrike mine area, Eureka County, Nevada. M.S. thesis, 179 pages.
- Thole, J.T., 1991, Ragged Top Caldera: Geology and geochemistry of a Miocene volcanic center, Pershing County, Nevada. M.S. thesis, 108 pages.
- Zimmerman, B.S., 1991, Geology and geochemistry of epithermal gold mineralization in the Lake Owyhee volcanic field-western Snake River Plain region of eastern Oregon and western Idaho. Ph.D. dissertation, 262 pages.
- Bloom, J.G., 1990, The geology, alteration, and mineralization of the Mineral Point Mining District, San Juan County, Colorado. M.S. thesis, 168 pages.
- Neal, W.S., 1987, Structure and geochemistry of the southeastern portion of the Chloride Mining District, Sierra County, New Mexico. M.S. thesis, 136 pages.
- Brooks, J.W., 1986, A mineralogical, fluid inclusion, and oxygen isotope study of the Mammoth Revenue vein, Platoro caldera, San Juan Mountains, Colorado. M.S. thesis, 206 pages.

CLASSES TAUGHT

Semester	Course number (Geol or noted)	Course title	Credits
Fall, 2016	350	Mineralogy and Crystallography	4
	102	Physical Geology	4
	498/598	Seminar	1/1
Spring, 2016	470	Introduction to Economic Geology	4
Fall, 2015	None	<i>Release for Associate Director</i>	
Spring, 2015	470	Introduction to Economic Geology	4
Fall, 2014	584	Stable Isotope Geochemistry	3
	350	Mineralogy and Crystallography	4
Spring, 2014	470	Introduction to Economic Geology	4
Fall, 2013	584	Stable Isotope Geochemistry	3
	None	<i>Medical Leave</i>	
Spring, 2013	498/598	Seminar	1/1
Fall, 2012	470	Introduction to Economic Geology	4
	498/598	Seminar	1/1
	350	Mineralogy and Crystallography	4
Spring, 2012	None	<i>sabbatical leave</i>	
Fall, 2011	350	Mineralogy and Crystallography	4

Spring, 2011	UH 390	Earth Resources	3
Fall, 2010	350	Mineralogy and Crystallography	4
	470	Introduction to Economic Geology	4
Spring, 2010	UH 390	Earth Resources	3
Fall, 2009	350	Mineralogy and Crystallography	4
Spring, 2009	595	Special Topics (Economic Geology field trip)	1
Fall, 2008	350	Mineralogy and Crystallography	4
	470	Introduction to Economic Geology	4
Spring, 2008	584	Stable Isotope Geochemistry	3
Fall, 2007	350	Mineralogy and Crystallography	4
	470	Introduction to Economic Geology	4
Spring, 2007	584	Stable Isotope Geochemistry	3
	596*	Advanced Topics in Geology	1
Fall, 2006	350	Mineralogy and Crystallography	4
	470	Introduction to Economic Geology	4
<i>Spring, 2006</i>		<i>Sabbatical Leave</i>	
Fall, 2005	<i>None</i>	<i>Chair duties</i>	
Spring, 2005	206	Field Petrology	3
Fall, 2004	350	Mineralogy and Crystallography	4
	498/598	Seminar	1/1
Spring, 2004	584	Stable Isotope Geochemistry	3
Fall, 2003	<i>None</i>	<i>Chair duties</i>	
Spring, 2003	597*	Oxygen and Carbon Stable Isotopes: Their use in Chemostratigraphy and Paleosols	1
	206	Field Petrology	3
Fall, 2002	<i>None</i>	<i>Chair duties</i>	
Spring, 2002	206	Field Petrology	3
	584	Stable Isotope Geochemistry	3
Fall, 2001	498/598	Seminar	1/1
Spring, 2001	206	Field Petrology	3
	571	Geochemistry of Hydrothermal Ore Deposits	3
Fall, 2000	<i>None</i>	<i>Chair duties</i>	
Spring, 2000	206	Field Petrology	3
Fall, 1999	101	Introduction to Geology	4
Spring, 1999	206	Field Petrology	3
	584	Isotope Geochemistry	3
Fall, 1998	<i>None</i>	<i>Chair duties</i>	
Spring, 1998	206	Field Petrology	3
	571	Geochemistry of Hydrothermal Ore Deposits	3

	590*	Use of Stable Isotopes in Ecological Investigations	2
Fall, 1997	573	Growth and Evolution of the Northern Cordilleran Continent	2
	498/598	Seminar	1/1
Spring, 1997	584	Isotope Geochemistry	3
	206	Field Petrology	3
Fall, 1996	350	Mineralogy and Crystallography	4
Summer, 1996	508	Advanced Field Methods	3
<i>Spring, 1996</i>		<i>Sabbatical leave</i>	
<i>Fall, 1995</i>		<i>Sabbatical leave</i>	
Spring, 1995	584	Isotope Geochemistry	3
Fall, 1994	306	Field Petrology	3
	350	Mineralogy and Crystallography	4
Spring, 1994	571	Geochemistry of Hydrothermal Ore Deposits	3
	573	Advanced Topics in Economic Geology	2
Fall, 1993	306	Field Petrology	3
	350	Mineralogy and Crystallography	4
Spring, 1993	592	Interdisciplinary Topics	3
Fall, 1992	306	Field Petrology	3
	350	Mineralogy and Crystallography	4
Spring, 1992	102	Physical Geology	4
	571	Geochemistry of Hydrothermal Ore Deposits	3
Fall, 1991	350	Mineralogy and Crystallography	4
Summer, 1991	508	Advanced Field Methods	3
Spring, 1991	102	Physical Geology	4
	584	Isotope Geochemistry	3
Fall, 1990	350	Mineralogy and Crystallography	4
<i>Spring, 1990</i>		<i>Sabbatical leave</i>	
<i>Fall, 1989</i>		<i>Sabbatical leave</i>	
Spring, 1989	498/598	Seminar	1
	584	Isotope Geochemistry	3
Fall, 1988	350	Mineralogy and Crystallography	4
	573	Advanced Topics in Economic Geology	2
Spring, 1988	571	Geochemistry of Hydrothermal Ore Deposits	3
Fall, 1987	350	Mineralogy and Crystallography	4
	573	Advanced Topics in Economic Geology	2
Spring, 1987	584	Isotope Geochemistry	3
Fall, 1986	350	Mineralogy and Crystallography	4
Spring, 1986	571	Geochemistry of Hydrothermal Ore Deposits	3

Fall, 1985	350	Mineralogy and Crystallography	4
Spring, 1985	571	Geochemistry of Hydrothermal Ore Deposits	3
	573	Advanced Topics in Economic Geology	2
Fall, 1984	498/598	Seminar	1/1
	350	Mineralogy and Crystallography	4
Spring, 1984	571	Metallic Mineral Deposits	3
Fall, 1983	564	Advanced Igneous Petrology	3

*Co-taught

Vita updated 5 January, 2017