**VITA**

JOHN R. BOWMAN

Born: May 29, 1947; Dayton, Ohio, USA

ACADEMIC POSITION: John R. Bowman, Professor, University of Utah, Department of Geology and Geophysics, 115 South 1460 East, Rm. 439 F.A. Sutton Bldg, Salt Lake City, Utah 84112.

EDUCATION:

B. S. College of William and Mary, Williamsburg, Virginia 1965-1969

M. S. The Ohio State University, Columbus, Ohio 1969-1971

Ph. D. University of Michigan, Ann Arbor, Michigan 1972-1978

SOCIETY AFFILIATIONS

Mineralogical Society of America

Geological Society of America

THESIS TITLES:

M. S. (Ohio State University) Use of the isotopic composition of strontium and silica content in determining the origin of Mesozoic basalt from Antarctica. Thesis advisor: Gunter Faure

Ph. D. (University of Michigan) Contact metamorphism, skarn formation, and origin of C-O-H fluids in the Black Butte aureole, Elkhorn, Montana. Thesis advisor: Eric Essene

PROFESSIONAL EXPERIENCE:

1. Ohio State University Geology Field Camp, Summer, 1970

2. Teaching Assistant, Ohio State University, 1969-1971

3. Teaching Assistant, Ohio State University Geology Field Camp, Summer, 1972

4. Teaching Assistant, University of Michigan, 1972-1976

5. Assistant Professor, Department of Geology and Geophysics, University of Utah, 1977-1982

6. Associate Professor, Department of Geology and Geophysics, University of Utah, 1982-1987

7. Professor, Department of Geology and Geophysics, University of Utah, 1987-present

GRADUATE STUDENT PROGRAM: Twenty-five previous students--22 M. S, 3 Ph. D; 2 current (2 Ph.D)

AWARDS

1985-86: Dept. of Geology and Geophysics Faculty Research Award

1989-90: Best Paper Award (with Mike Gerstner and Jill Pasteris), Canadian Mineralogist

1992-93: Dept. of Geology and Geophysics Distinguished Faculty Teaching Award

1995-96: Dept. of Geology and Geophysics Distinguished Faculty Teaching Award

1997-98: Dept. of Geology and Geophysics Distinguished Faculty Teaching Award

2000-01: Distinguished University Teaching Award

2006-07: Hebert Fellowship, Sabbatical leave, Universität Lausanne, Lausanne, CH

2007-08: Dept. of Geology and Geophysics Faculty Research Award

2009-10: Dept. of Geology and Geophysics Distinguished Faculty Teaching Award

2010-11: Dept. of Geology and Geophysics Outstanding Faculty Teaching Award

2010-11: College of Mines and Earth Sciences Outstanding Faculty Teaching Award

2010-11: Best Paper Award in 2011 (with Desmond Moser, Lisa Cupelli, Ian Barker, Rebecca Flowers, Joe Wooden and J.R. Hart), Canadian Journal of Earth Sciences

## PUBLICATIONS

1. Faure, G, Bowman, J. R., Jones, L.M., and Elliot, D. H., 1974, Strontium isotope composition and petrogenesis of the Kirkpatrick Basalt, Queen Alexandra Range, Antarctica: Contr. Mineral. Petrol., v. 48, p. 153-169.

2. Faure, G., Owen, L. B., Bowman, J. R., and Elliot, D. H., 1974, Zirconium concentrations and initial strontium 87/strontium 86 ratios, Kirkpatrick Basalt, Storm Peak, Queen Alexandra Range: Antarctic Jour. of the U. S., v. 9, p. 239-241.

3. Ward, S. H., Parry, W. T., Nash, W. P., Sill, W. R., Cook, K. L., Smith, R. B., Chapman, D. S., Brown, F. H., Whelan, J. A., and Bowman, J. R., 1981, A summary of the geology, geochemistry, and geophysics of the Roosevelt Hot Springs Thermal Area, Utah: Geophysics, v. 43, p. 1515-1542.

4. Faure, G., Bowman, J. R., and Elliot, D. H., 1979, The initial 87Sr/ 86Sr ratios of the Kirwan volcanics of Dronning Maud Land--Comparison with the Kirkpatrick Basalt, Transantarctic Mountains: Chem. Geol., v. 26, p. 27-36.

5. Valley, J. W., Peterson, E. U., Essene, E. J., and Bowman, J. R., 1982, Fluorphlogopite and fluortremolite in Adirondack marbles and calculated C-O-H-F fluid compositions: Amer. Mineral., v. 67, p. 545-557.

6. Bowman, J. R. and Essene, E. J., 1982, P-T-X(CO2) conditions of contact metamorphism in the Black Butte aureole, Elkhorn, Montana: Amer. Jour. Sci., v. 282, p. 311-340.

7. Bowman, J. R. and Cole, D., 1982, Hydrogen and oxygen isotope geochemistry of cold and warm springs from the Tuscarora, Nevada Thermal Area: Geothermal Resources Council Transactions.

8. Kyle, P. R., Pankhurst, R. J., and Bowman, J. R., 1983, Isotopic and chemical variations in Kirkpatrick Basalt Group rocks from Southern Victoria Land: In Oliver, R. L., James, P. R., and Jago, J. B. (eds) Antarctic Earth Science, Cambridge University Press, Cambridge, p. 234-237.

9. Bowman, J. R. and Essene, E. J., 1984, Contact skarn formation at Elkhorn, Montana--I. P-T-Component Activity conditions of early skarn formation: Amer. Jour. Sci., v. 284, p. 498- 550.

10. Mensing, T. M., Faure, G., Jones, L. M., Bowman, J. R., and Hoefs, J., 1984, Petrogenesis of the Kirkpatrick Basalt, Solo Nunatak, Northern Victoria Land, Antarctica, based on isotopic compositions of strontium, oxygen, and sulfur: Contr. Mineral. Petrol., v. 87, p. 101-108.

11. Brown, P. E., Bowman, J. R., and Kelly, W. C., 1985, Petrologic and stable isotopic constraints on the source and evolution of skarn-forming fluids at Pine Creek, California: Econ. Geol., v. 80, p. 72-95.

12. Bowman, J. R., O'Neil, J. R., and Essene, E. J., 1985, Contact skarn formation at Elkhorn, Montana--II. Origin and evolution of C-O-H skarn fluids: Amer. Jour. Sci., v. 285, p. 621-660.

13. Cerling, T. E., Brown, F. H., and Bowman, J. R., 1985, Low temperature alteration of volcanic glass--Hydration, Na, K, 18O, and Ar mobility: Chemical Geology(Isotope Geoscience Section), v. 52, p. 281-293.

14. Valley, J. W., Peacor, D. R., Bowman, J. R., Essene, E. J., and Allard, M. J., 1985, Crystal chemistry of a magnesium vesuvianite and implications for phase equilibria in the system CaO-MgO-Al2O3-SiO2-H2O-CO2: Jour. Metamorphic Geology, v. 3, p. 137-153.

15. Bowman, J. R., Covert, J. J., Clark, A. H., and Mathieson, G. A., 1985, The CanTung E-zone scheelite skarn orebody, Tungsten, Northwest Territories--Oxygen, hydrogen, and carbon isotope studies: Econ. Geol., v. 80, p.1872-1895.

16. Bowman, J. R. and Ghent, E. D., 1986, Oxygen and hydrogen isotope study of minerals from metapelitic rocks, staurolite to sillimanite zones, Mica Creek, British Columbia: Jour. Metamorphic Geology, v. 4, p. 131-141.

17. Bowman, J. R., Parry, W. T., Kropp, W. T., and Kruer, S., 1987, Chemical and stable isotopic evolution of hydrothermal solutions at Bingham Canyon, Utah: Econ. Geol., v. 82, p. 395-428.

18. Barton, C. E., Solomon, D. K., Bowman, J. R., Cerling, T. E., and Sayer, M. D., 1987, Chloride budgets in transient lakes: Lakes Baringo, Naivasha, and Turkana, Kenya: Limnol. Oceanogr., v. 32, p. 745-751.

19. Harper, G. D., Bowman, J. R., and Kuhns, R. G., 1988, A field, chemical, and stable isotopic study of subseafloor metamorphism of the Josephine ophiolite, California-Oregon: Jour. Geophys. Res., v. 93, No. B5, p. 4625-4656.

20. Pavlis, T. L., Monteverde, D. H., Bowman, J. R., Rubenstone, J. L., Reason, M. D., 1988, Early Cretaceous near-trench plutonism in southern Alaska: A tonalite-trondhjemite intrusive complex injected during ductile-thrusting: Tectonics, v. 7, No. 6, p. 1179-1199.

21. Cerling, T. E., Bowman, J. R., and O'Neil, J. R., 1989, An isotopic study of a fluvial-lacustrine sequence--The Plio-Pleistocene Koobi Fora Sequence, East Africa: Palaeogeog. Palaeoclim. Palaeoec. , v. 63, p. 335-356.

22. Gerstner, M. R., Bowman, J. R., and Pasteris, J. D., 1989, Skarn formation at the MacMillan Pass tungsten deposit (MacTung), Yukon and Northwest Territories. Part I. P-T-X-V characterization of the methane-bearing, skarn-forming fluids: Canadian Mineral., v. 27, p. 545-563. **[Winner of “Best Paper” award for the 1989 volume of Canadian Mineralogist]**

23. Quade, J., Cerling, T. E., and Bowman, J. R., 1989, Systematic variations in the carbon and oxygen isotopic composition of pedogenic carbonate along elevation transects in the southern Great Basin, USA: Geol. Soc. Amer. Bull., v. 101, p. 464-475.

24. Quade, J., Cerling, T. E., and Bowman, J. R., 1989, Development of Asian monsoon revealed by marked ecological shift during the latest Miocene in northern Pakistan: Nature, v. 342, p. 163-166.

25. Cerling, T. E., Quade, J., Wang, Y., and Bowman, J. R., 1989, Carbon isotopes in soils and palaeosols as ecology and palaeoecology indicators: Nature, v. 341, p. 138-139.

26. Quade, J., Cerling, T. E., Bowman, J. R., and Asif Jah, M., 1990, Palaeoecologic reconstruction of floodplain environments using palaeosols from upper Siwalik Group sediments, northern Pakistan: In Quaternary of Pakistan, (J. R. Schroder, ed.), Univ. Nebraska Press, Lincoln, Nebraska.

27. Parry, W. T. and Bowman, J. R., 1990, Chemical and stable isotope models for Boundary Creek warm springs, Southwestern Yellowstone National Park, Wyoming: Jour. Volcanol. Geotherm. Res., v. 43, p. 133-157.

28. Norman, D. K., Parry, W. T., and Bowman, J. R., 1991, Petrology and geochemistry of propylitic alteration at Southwest Tintic, Utah: Econ. Geol., v. 86, p.13-28.

29. Bowman, J. R. and Willett, S. D., 1991, Spatial patterns of oxygen isotope exchange during one-dimensional fluid infiltration: Geophys. Res. Letters, v. 18, p. 971-974.

30. Cosca, M. A., Essene, E. J., and Bowman, J. R., 1991, Complete chemical analyses of metamorphic hornblendes: Implications for normalizations, calculated H2O activities, and thermobarometry: Contrib. Mineral. Petrol., v. 108, p. 472-484.

31. Cerling, T. E., Solomom, D. K., Quade, J., and Bowman, J. R., 1991, On the isotopic composition of carbon in soil carbon dioxide: Geochim. Cosmochim. Acta: v. 55, p. 3403-3405.

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33. Fleming, T. H., Elliot, D. H., Foland, K. A., Jones, L. M., and Bowman, J. R., 1993, Mid-Cretaceous disturbance of Rb-Sr and K-Ar isotopic systems in the Kirkpatrick Basalt, north Victoria Land, Antarctica: In: Gondwana 8--Assembly, evolution and dispersal, Findlay, Unrug, Banks, and Veevers (eds), p. 411-424, A. A. Balkema, Rotterdam.

34. Turner, D. R. and Bowman, J. R., 1993, Origin and evolution of skarn fluids, Empire zinc skarns, Central Mining District, New Mexico, U. S. A.: Applied Geochemistry, v. 8, p. 9-36.

1. Alexander, R. J., Harper, G. D., and Bowman, J. R., 1993, Oceanic faulting and fault-controlled subseafloor hydrothermal alteration in the sheeted dike complex of the Josephine Ophiolite: Jour. Geophys. Research, v. 98, p. 9731-9759.
2. Wang, Y., Cerling, T.E., Quade, J., Bowman, J.R., Smith, G.A., and Lindsay, E.H., 1993, Stable isotopes of paleosols and fossil teeth as paleoecology and paleoclimate indicators: An example from the St. David Formation, Arizona: American Geophysical Union Monograph 78, p. 241-248.

37. Bowman, J. R., Willett, S. D., and Cook, S. J., 1994, Oxygen isotopic transport and exchange during fluid flow: One-dimnsional models and applications: Amer. J. Sci., v. 294, p. 1-55.

38. Cook, S. J. and Bowman, J. R., 1994, Contact metamorphism surrounding the Alta Stock: Thermal constraints and evidence of advective heat transport from calcite + dolomite geothermometry: Amer. Mineralogist, v. 79, p. 513-525.

39. Jewell, P. W., Rahn, T. A., and Bowman, J. R., 1994, Hydrology and chemistry of thermal waters near Wells, Nevada: Ground Water, v. 32, p. 657-665.

40. Barnett, D. E., Bowman, J. R., Pavlis, T. L., Rubenstone, J. R., Snee, L. W., Onstott, T. C., 1994, Metamorphism and near-trench plutonism during intiial accretion of the Cretaceous Alaskan forearc: Jour. Geophysical Research, v. 99, p. 24,007-24,024.

41. Barnett, D. E., and Bowman, J. R., 1995, Coupled mass transport and kinetically limited isotope exchange--Applications and exchange mechanisms: Geology, v. 23, p. 225-228.

42. Barnett, D. E., and Bowman, J. R., 1996, Kinetically limited isotope exchange in a shallow level normal fault, Mineral Mountains, Utah: Jour. Geophysical Research, v. 101, p. 673-686.

43. Cook, S. J., Bowman, J. R., and Forster, C. B., 1997, Contact metamorphism surrounding the Alta Stock: Finite element model simulation of heat- and 18O/16O mass-transport during prograde metamorphism: American Journal of Science, v. 297, p. 1-55.

44. Bowman, J. R., 1998, Phase Equilibria, In: Mineralized Intrusion-Related Skarn Systems, D. Lentz (ed), Mineralogical Association of Canada Short Course, v. 26, p. 1-50, Quebec City, Quebec, May, 1998.

45. Bowman, J. R., 1998, Stable Isotope Systematics, In: Mineralized Intrusion-Related Skarn Systems, D. Lentz (ed), Mineralogical Association of Canada Short Course, v. 26, p. 99-146, Quebec City, Quebec, May, 1998.

1. Cook, S. J. and Bowman, J. R., 2000, Contact metamorphism surrounding the Alta stock--Fluid-rock interaction accompanying metamorphism of siliceous dolomites: Journal of Petrology, v. 41, p. 739-757.

47. Chan, M.A., Parry, W.T., and Bowman, J.R., 2000, Diagenetic hematite and manganese oxides and fault-related fluid flow in Jurassic sandstones, southeastern Utah: American Association of Petroleum Geologists, v. 84, p. 1281-1310.

48. Roselle, G.T., Bowman, J.R., and Forster, C.B., 2003, Development and stability of multiple groundwater flow systems near cooling plutons: Jour. Geophysical Research, v. 108, NO. B1, p. 1-13.

49. Bowman, J.R., Sisson, V.B., Valley, J.W., and Pavlis, T.L., 2003, Oxygen isotope constraints on fluid infiltration associated with high temperature--low pressure metamorphism (Chugach Metamorphic Complex) within the Eocene southern Alaska fore-arc: Geological Society of America Special paper 371, p. 237-252.

51. Chan, A.A., Johnson, C.M., Beard, B.L., Bowman, J.R., and Parry, W.T., 2006, Iron isotopes constrain the pathways and formation mechanisms of terrestrial oxide concretions: A tool for tracing iron cycling on Mars? Geosphere, v. 2, no. 7, p. 324-332.

52. Moser, D.E., Bowman, J.R., Wooden, J., Valley, J.W., Masdab, F., and Kita, N., 2008, Creation of a continent recorded by zircon zoning: Geology, v. 36, p.239-242.

53. Bowman, J.R., Valley, J.W., and Kita, N.T., 2009, Mechanisms of oxygen isotopic exchange and isotopic evolution of 18O/16O-depleted periclase zone marbles in the Alta aureole, Utah—Insights from ion microprobe analysis of calcite: Contributions to Mineralogy and Petrology, v. 157, p. 77-93.

54. Müller, T., Baumgartner, L.P., Foster, T. L., and Bowman, J.R., 2009, Crystal size distribution and periclase formation in contact metamorphic dolomite marbles from the Southern Adamello massif, Italy: Journal of Petrology, v. 50, no. 3, p.451-465; DOI: 10.1093/petrology/egp007.

55. Moser, D. E., Cupelli, C. L., Barker, I., Flowers, R. M., Bowman, J. R., Wooden, J. L., and Hart, R., 2011, New zircon shock phenomena and their use for dating and reconstruction of large impact structures revealed by electron nanobeam (EBSD, CL, EDS) and isotopic U-Pb and (U-Th)/He analysis of the Vredefort dome: Canadian Journal of Earth Sciences, v. 48, p. 117-139. **[Winner of “Best Paper” award for the 2011 volume of Canadian Journal of Earth Sciences]**

56. Bowman, J. R., Moser, D. E., Valley, J. W., Wooden, J. L., Kita, N. T., and Masdab, F. K., 2011, Zircon U-Pb isotope, 18O and trace element response to 80 m.y. of high temperature metamorphism in the lower crust; sluggish diffusion and new records of Archean craton formation: American Journal of Science, v. 311, November, 719-772, DOI 10.2475/09.2011.01.

57. Marston, T.M., Parry, W.T., Bowman, J.R., and Solomon, D. Kip, 2012, Tritium content of clay minerals: Clays and Clay Minerals, v. 60, no. 2, p. 186-199.

58. Chan, M.A., Potter, S.L., Bowen, B.B., Parry, W.T., Barge, L.M., Seiler, W., Petersen, E.U., and Bowman, J.R., 2012, Characteristics of terrestrial ferric oxide concretions and implications for Mars: SEPM Special Publication No. 102, CD/DVD ISBN 978-1-56576-313-5, p. 253-270.

59. McLin, K.S., Moore, J., Bowman, J.R. and McCulloch, J.E., 2012, Mineralogy and fluid inclusion gas chemistry of production well mineral scale deposits at the Dixie Valley geothermal field, USA: Geofluids, v. 12, p. 216-227.

60. Etzel, T.M., Bowman, J.R., McCulloch, J.M., Moore, J.N., Spicuzza, M.J., and Valley, J.W., 2013, Oxygen isotope evidence of water-rock interactions in the Coso geothermal system. Proceedings, Thirty-eighth Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA, p. 1-7, SGP-TR-198.

61. Cupelli, C.L., Moser, D.E., Barker, I.R., Darling, J.R., Bowman, J.R. and Dhuime, B., 2014, Discovery of mafic impact melt in the center of the Vredefort dome: Archetype for continental residua of early Earth cratering? Geology, v. 42, p. 403-406, doi:10.1130/G35297.1

62. Jones, C., Moore, J.N., Bowman, J.R. and Walters, M., 2016, High temperature hydrothermal metamorphism at The Geysers geothermal field: An investigation of mineral chemistry and vein paragenesis from an active contact metamorphic environment. Proceedings, Forty-First Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, CA, p. 1-16, SGP-TR-209.

63. Etzel, T.M., Bowman, J.R., Moore, J.N., Valley, J.W., Spicuzza, M.J., and McCulloch, J.M., 2017, Oxygen isotope systematics in an evolving geothermal system: Coso Hot Springs, California. Journal of Volcanology and Geothermal Research, v. 329, p. 54-68. [http://dx.doi.org/10.1016/j.jvolgeores.2016.11.0140377-0273/]

64. Jones, C.G., Walters, M., Moore, J.N., and Bowman, J.R., 2017, Origin and evolution of vein minerals in the high-temperature geothermal reservoir of the Northweste Geysers, California. Transactions of the Geothermal Resources Council, v. 41, p. 1516-1535.

65. Jones, C.G., Barker, S. Simmons, S.F., Moore, J.N., and Bowman, J.R., 2017, The oxygen and carbon isotope systematics of carbonate-hosted geothermal reservoirs at Cove Fort and Thermo, Utah. Transactions of the Geothermal Resources Council, v. 41, p. 1470-1480.

66. Stearns, M.A., Bowman, J.R., Bartley, J.M., and Fernandez, D.P., 2017, Ten million years of pulsed fluid flow through the Alta stock driven by incremental emplacement of the Little Cottonwood stock, Wasatch Range, Utah. Utah Geological Association, v. 46.

67. Mahar, M.A., Pavlis, T.L., Bowman, J.R., Conrad, W.K., and Goodell, P. C., 2018, Early Cretaceous ridge subduction beneath southern Alaska: Insights from zircon U-Pb geochronology and hafnium and oxygen isotopic compositions of the Western Chugach tonalite-trondhjemite suite. Geological Society of America Bulletin, v. 130, 26 pp. [http://doi.org/10.1130/B31918.1].

**PUBLICATIONS (In review, preparation)**

1. Stearns, M.A., Bartley, J.M., Bowman, J.R., Forster, C.W., Beno, C., Riddle, D.D., Callis, S., and Udy, N., Simultaneous magmatic and hydrothermal regimes recorded by multiphase U-Pb petrochronology, Alta-Little Cottonwood stocks, Utah, USA (submitted to **Geosciences**).

2. Beno, C., Bowman, J.R., Loury, P., Chadwell, L. and Fernandez, D., Evidence for dendritic crystallization of forsterite olivine during contact metamorphism of siliceous dolostones, Alta stock, Utah aureole (submitted to **Journal of Petrology**).

3. Jones, C.G., Bowman, J. R., Moore, J.N., Valley, J.W., Kitajima, K. and Walters, M.A., Fluid evolution in The Geysers geothermal system, California: Evidence from fluid inclusion and secondary ion mass spectrometry (SIMS) oxygen isotope analyses of vein quartz (in preparation; to be submitted to **Geochemica Cosmochimica Acta**).

4. Bowman, J.R., Hilber, M., Moser, D.E., Valley, J.W., Mazdab, F.K., and Wooden, J.L., Micron-scale oxygen isotope zoning in metabasalt zircon: a robust history of fluid flow during Archean crustal growth (in preparation).

### ABSTRACTS

1. Bowman, J. R., Holliday, B., Johnson, G., and Rohr, D., 1969, Origin of the coquina bar facies of the Yorktown Formation at Chuckatuck, Virginia: Virginia Academy of Sciences, Blacksburg, Va.

2. Bowman, J. R., Faure, G., and Elliot, D. H., 1973, Isotope geochemistry of strontium of the Kirkpatrick Basalt, Storm Peak, Antarctica(abst.): G.S.A. Annual Mtg., Dallas, Texas, G. S. A. Program with Abstracts, v. , p.

3. Bowman, J. R., 1974, Amphiboles from high temperature Grenville marbles near Bancroft, Ontario(abst.): G.S.A. Annual Mtg., Miami Beach, Florida, G. S. A. Programs with Abstracts, v.

4. Bowman, J. R., and Essene, E. J., 1975, Application of thermometry to contact metamorphism at Elkhorn, Montana: International Conference on Geothermometry and Geobarometry, Penn. State University, University Park, PA.

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6. Bowman, J. R., and O'Neil, J. R., 1976, Skarn-forming fluids of magmatic origin at Elkhorn, Montana: G.S.A. Annual Mtg., Denver, Colorado, G.S.A. Program with Abstracts, v.

7. Bowman, J. R., and Essene, E. J., 1977, Contact metamorphism of chlorite-bearing dolomites at Elkhorn, Montana: G.S.A. Annual Mtg., Seattle, Washington, G.S.A. Program with Abstracts, v.

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9. Bowman, J. R., and O'Neil, J. R., 1978, Stable isotope studies of Mg(Fe)-Al-Si skarns, Elkhorn, Montana(invited abst): Cordilleran Section, G.S.A. Mtg., Tempe, AZ., G.S.A. Program with Abstracts, v.

10. Bowman, J. R., and Essene, E. J., 1979, Clintonite-bearing assemblages in contact skarns, Elkhorn, Montana: Spring A.G.U. Mtg., Washington, D.C., EOS Trans., v.

11. Brown, P. E., and Bowman, J. R., 1979, Physical-chemical conditions of tungsten skarn formation at Pine Creek, California: G.S.A. Annual Mtg., San Diego, CA., G.S.A. Program with Abstracts, v.

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14. Rohrs, D.T., and Bowman, J. R., 1980, Carbon, oxygen, and hydrogen isotope studies of the Roosevelt Hot Springs geothermal area, Southwestern Utah: Fall A.G.U. Mtg., San Fransisco, CA., EOS Trans., v.

15. Cerling, T.E., Bowman, J. R., and Brown, F. H., 1980, Potassium loss from rhyolite volcanic glass and its relation to oxygen isotope exchange and apparent K-Ar age: Fall A.G.U. Mtg., San Fransisco, CA., EOS Trans., v.

16. Bowman, J. R., and Cook, S. J., 1981, Physical-chemical conditions of contact skarn formation at Alta, Utah: G.S.A. Annual Mtg., Cincinnati, Ohio, G.S.A. Program with Abstracts, v.

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18. Crecraft, H. R., Bowman, J. R., and Nash, W. P., 1981, Stable isotope studies of Late Cenozoic rhyolites, Twin Peaks, Utah: Fall A.G.U. Mtg., San Fransisco, CA., EOS Trans., v.

19. Kyle, P. R., Pankhurst, R. J., and Bowman, J. R., 1982, Isotope and chemical variation in Ferrar Group volcanic rocks from southern Victoria Land: Scientific Committee on Antarctic Research(SCAR) Annual Mtg., August, Adelaide, Australia.

20. Anderson, R., Armstrong, R., and Bowman, J. R., 1983, Potential of SE Selywn plutonic suite for W-skarn deposits: Invited abstract, Symposium on tin and tungsten deposits of the Canadian Cordillera, Geol. Assoc. Canada Annual Mtg., Victoria, B. C.

21. Bowman, J. R., Covert, J. J., Mathieson, G. A., and Clark, A. H., 1983, Origin of skarn- forming fluids and fluid-rock interaction, CanTung tungsten skarn, Northwest Territories, Canada: Invited abstract, Symposium on tin and tungsten deposits of the Canadian Cordillera, Geol. Assoc. Canada Annual Mtg., Victoria, B.C.

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23. Connelly, M. P., and Bowman, J. R., 1984, Petrologic and fluid inclusion studies of copper skarns, Rocky Range, Southwest Utah: G.S.A. Annual Mtg., Reno, Nevada, G.S.A. Program with Abstracts, v. 16, p. 476.

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110. Bowman, J.R., 2012, Geometrical and geochemical properties of isotope exchange and reaction fronts in the Alta aureole, Utah: evidence for scale-dependent heterogeneity and anisotropy in permeability of marbles: Fall Am. Geophys. Union Mtg., San Fransisco, CA.

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113. Beno, C.J., Stearns, M.A., Bowman, J.R., and Bartley, J.M., 2017, U/Th-Pb monazite age constraints on the timing and duration of contact metamorphism in the Alta, Utah, contact aureole. Geol. Soc. Amer. Mtg, Seattle, WA.

114. Bowman, J.R., Stearns, M.A., and Bartley, J.M., 2017, Evolving perspectives on the thermal budgets and timescales of contact metamorphism. Invited talk, Topical Session T149, Geol. Soc. Amer. Mtg, Seattle, WA.

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#### INVITED ABSTRACTS AND LECTURES

1. Stable Isotope Studies of Mg (Fe)-Al-Si Skarns, Elkhorn, Montana: Invited abstract for the "Symposium on Porphyry and Non-Porphyry Skarns", Cordilleran Section, Geol. Soc. Am. Mtg., Tempe, AZ, 1978.

2. Origin of Skarn-Forming Fluids and Fluid-Rock Interaction, CanTung Tungsten Skarn, Northwest Territories, Canada: Invited abstract for the "Symposium on Tin and Tungsten Deposits of the Canadian Cordillera", Geol. Assoc. Can. Mtg., Victoria, B.C., 1983.

3. Physical-Chemical Conditions of Contact Skarn Formation and Stable-Isotope Constraints on the Origin of Skarn Fluids: Invited lecture, Department of Geological Sciences, New Mexico Institute of Technology, Socorro, New Mexico, Nov., 1983.

4. Groundwater Influx Coupled with the Transition from Lithostatic to Hydrostatic Fluid Pressure During Contact Skarn Development: Invited abstract for the "Symposium on the Role of Groundwater Flow in Geologic and Geodynamic Processes", Am. Geophys. Union Mtg., Baltimore, MD., 1986.

5. Hydrothermal Metamorphism of the Josephine Ophiolite, Klamath Mountains, California-Oregon, Harper, G. D. and Bowman, J. R.: Invited abstract for the "Symposium on Subseafloor Metamorphism of Oceanic Crust", Am. Geophys. Union Mtg., Baltimore, MD., 1986.

6. Stable Isotope Evolution of Hydrothermal Fluids in the Bingham Canyon, Utah, Porphyry Copper Deposit: Invited lecture, Department of Geology, Brigham Young University, March, 1986.

7. Stable Isotope Evolution of Hydrothermal Fluids in the Bingham Canyon, Utah, Porphyry Copper Deposit: Invited lecture, Pacific Geoscience Centre, Victoria, B. C., Nov., 1986.

8. Stable Isotope Evolution of Hydrothermal Fluids in the Bingham Canyon, Utah, Porphyry Copper Deposit: Invited lecture, Department of Earth and Space Sciences, State University of New York--Stony Brook, Stony Brook, New York, April, 1987.

9. Stable Isotope Evolution of Hydrothermal Fluids in the Bingham Canyon, Utah, Porphyry Copper Deposit: Invited lecture, Lamont-Doherty Geological Observatory, Palisades, New York, May, 1987.

10. Isotopic Evolution of Hydrothermal Fluids in the earth's Crust--The Roles of Water-Rock Interaction, Water/Rock Ratio, and Exchange Pathlines: Invited lecture, Department of Geological Sciences, State University of New York--Albany, Albany, New York, Oct., 1987.

11. Isotopic Evolution of Hydrothermal Fluids in the Earth's Crust--The Roles of Water-Rock Interaction, Water/Rock Ratio, and Exchange Pathlines: Invited lecture, Department of Geological Sciences, University of New Orleans, New Orleans, LA., Oct., 1987.

12. Stable Isotopic and Petrologic Evidence for the Infiltration of Water-Rich Fluids During the Development of the Alta Stock Thermal Aureole: Invited lecture, Department of Earth and Space Sciences, State University of New York--Stony Brook, Stony Brook, New York, Nov. 1987.

13. Isotopic evolution of hydrothermal fluids in the crust: Distinguished Lecture Series, Dept. of Geology and Geophysics, University of Utah, SLC. Utah, May 12, 1988.

14. Isotopic evoution of hydrothermal fluids in shear zones: Invited lecture, Dept. of Geosciences, University of Southern California, Los Angeles, CA., March 22, 1989.

15. Processes of fluid flow and fluid-rock interaction in crustal hydrothermal systems--Insights from transport models of isotopic exchange: Turner Distinguished Lecture Series, University of Michigan, Ann Arbor, Michigan, Sept. 20, 1991.

16. Transport models of stable isotopic exchange in hydrothermal systems--Constraints on flow parameters and isotopic evolution of hydrothermal fluids (Invited abstract): Geol. Soc. Amer. Mtg., San Diego, CA., 1992, Abstracts with Programs, v. 22.

17. Processes of fluid flow and fluid-rock interaction in crustal hydrothermal systems--Insights from transport models of isotopic exchange: Invited lecture, Dept. of Geosciences, University of Oregon, Eugene, Oregon, January 17, 1992.

18. Processes of fluid flow and fluid-rock interaction in crustal hydrothermal systems--Insights from transport models of isotopic exchange: Invited lecture, Dept. of Geosciences, University of New Mexico, Albuequerque, New Mexico, February 27, 1992.

19. Processes of fluid flow and fluid-rock interaction in crustal hydrothermal systems--Insights from transport models of isotopic exchange: Invited lecture, Dept. of Geosciences, Northern Arizona University, Flagstaff, Arizona, April 15, 1992.

20. Isotopic exchange and mass transport during fluid flow: Keynote Speaker, Penrose Conference on Fluid-Volcano Interactions, October 4-9, 1992, Kahneeta Resort, Warm Springs, Oregon.

21. Processes and patterns of fluid flow in crustal hydrothermal systems--Insights from isotope transport models: Invited lecture, University of Arizona, Tucson, Arizona, January 28, 1993.

22. Physical and chemical processes in contact metamorphic hydrothermal systems--Insights from geochemical data and numerical modeling: Invited lecture, University of Wisconsin, Spring, 1998.

23. Phase equilibria aspects of skarn formation: Invited speaker for the Short Course on Mineralized Intrusion-Related Skarn Systems sponsored by the Mineralogical Association of Canada, D. Lentz (convener), Quebec City, Quebec, May, 1998.

1. Stable isotope systematics of mineralized intrusion-related skarn systems: Invited speaker for the Short Course on Mineralized Intrusion-Related Skarn Systems sponsored by the Mineralogical Association of Canada, D. Lentz (convener), Quebec City, Quebec, May, 1998.

25. Timescales of fluid infiltration, mineral reaction, and 18O/16O exchange between olivine and calcite in marbles of the Alta Stock thermal aureole, Utah (Invited speaker for the Special session on Futures in Petrology): Geocanada2000 (Annual meeting of the Geological Association of Canada), Calgary, Alberta, CANADA, May 29-June 1, 2000.

1. Timescales of heterogenous, multiple-pulse fluid infiltration during contact metamorphism, Alta Aureole, Utah (Invited speaker), Goldschmidt Conference, Roanoke, VA., May 19-24, 2001.
2. Modeling the effects of fluid flow, reaction kinetics, diffusion, and porosity on mixed volatile (CO2-H2O) decarbonation reactions in contact aureoles. Invited Keynote Speaker, Penrose Conference on Mass Redistribution in Continental Magmatic-Hydrothermal Systems, Yellowstone, WY and Butte, MT, Sept. 6-11, 2004.

27. Ion microprobe (SIMS) isotopic evidence (U, Pb, O) for slow (dry) diffusion of oxygen in granulite-grade Archean zircons, Kapuskasing Uplift, Canada: Invited lecture, University of Lausanne, Lausanne, Switzerland, Nov. 22, 2006.

28. Ion microprobe (SIMS) isotopic evidence (U, Pb, O) for slow (dry) diffusion of oxygen in granulite-grade Archean zircons, Kapuskasing Uplift, Canada: Invited lecture, University of Geneva, Geneva, Switzerland, March 29, 2007.

29. Lead and oxygen isotopic zoning in granulite-grade zircons, Kapuskasing Uplift, Canada: a record of creation of Archean crust, Invited lecture, University of Texas-El Paso, El Paso, TX, February 7, 2008.

30. Lead and oxygen isotopic zoning in granulite-grade zircons, Kapuskasing Uplift, Canada: a micro-record of creation of Archean crust, Invited lecture, University of Utah, February 12, 2009.

31. Evolving perspectives on the thermal budgets and timescales of contact metamorphism. Invited presentation, Geological Society of America meeting, Topical Session T149, October 2017.

32. There and back again; fluid history during descent of the gold-bearing Borden Lake Belt, Kapuskasing Uplift. Keynote presentation, Percival session, Geological Association of Canada annual meeting, Vancouver, BC, June, 2018.

#### GRADUATE STUDENTS

A. PAST STUDENTS—ADVISOR

1. 1980, M.S., David T. Rohrs, Thesis: A Light Stable Isotope Study of the Roosevelt Hot Springs Thermal Area, Southwestern Utah

2. 1982, M.S., Stephen J. Cook, Thesis: The Physical-Chemical Conditions of Contact Skarn Formation at Alta, Utah

3. 1982, M.S., Walter P. Kropp, Thesis: An Alteration and Light Stable Isotope Study of the Bingham Canyon, Utah, Porphyry System

4. 1983, M.S., John J. Covert, Thesis: The Origin of Skarn-Forming Fluids and Wallrock/Skarn Interaction at CanTung, Northwest Territory, Canada

5. 1984, M.S., Michael P. Connelly, Thesis: Petrologic and Fluid Inclusion Studies of the Bawana and Maria Copper Skarns, Rocky Range, SW Utah

6. 1985, M.S., William M. Kemp, III, Thesis: A Stable Isotope and Fluid Inclusion Study of the Contact Al (Fe)-Ca-Mg-Si Skarns in the Alta Stock Aureole, Alta, Utah

7. 1985, M.S., Cynthia A. Luchetti, Thesis: Geology, Petrology, and Geochemistry of the Triassic Mafic and Chert Terranes of the Seldovia Bay Complex, Kenai Peninsula, Alaska

8. 1985, M.S., David C. Tomten, Thesis: Geothermometry and Geobarometry of Metamorphosed Belt Series, Northwest of the Idaho Batholith, Idaho

9. 1985, M.S., David R. Turner, Thesis: A Petrologic and Fluid Inclusion Study of Zinc Skarns of the Buckhorn Gulch Area, Central Mining District, Grant County, New Mexico

10. 1986, M.S., Karl S. Bromley, Thesis: A Stable Isotope Study of the Corral Canyon and Wasatch Fault Shear Zones, Utah

11. 1986, M.S., Russell V. Knight, Thesis: Metamorphism of Belt Supergroup Calc-Silicate Rocks Northwest of the Idaho Batholith

12. 1986, M.S., Michael R. Gerstner, Thesis: A Fluid Inclusion and Petrologic Study of the MacTung Scheelite Skarn Deposit, Yukon-Northwest Territories, Canada

13. 1990, Ph. D., David R. Turner, Thesis: Geochemistry, Stable Isotopes, and Fluid Flow of the Empire Zinc Skarns, Central Mining District, Grant County, New Mexico

14. 1992, Ph. D., Stephen J. Cook, Thesis: Contact Metamorphism Surrounding the Alta Stock, Little Cottonwood Canyon, Utah

15. 1994, M.S., Dean L. Armstrong, Thesis: Geothermometry and heat transport in the Alta aureole, Little Cottonwood Canyon, Utah

1. 1994, M.S., Saijin Huang, Thesis: Effects of reaction kinetics, diffusion-dispersion, and fluid infiltration on mixed-volatile metamorphic reactions: One-dimensional finite-element models of heat and mass transport

17. 2002, M.S., Wes Christensen, Thesis: High temperature fracture permeability in the Alta stock, Utah: Constraints from thermal and isotopic evidence preserved in the Alta aureole

18. 2005, M.S., Katherine M. Kovac, Thesis: Geologic framework and paragenesis of the East Flank, Coso Geothermal Field, California

19. 2006, M.S., Lori Chadwell, Thesis: Quantitative textural relationships of forsterite in the Alta Stock aureole, Alta, Utah

20. 2008, M.S., Clay Jones, Thesis: A comparison of the potential metamorphic and igneous CO2 fluxes from the Salton Sea geothermal system, California

21. 2009, M.S., Benjamin Johnson, Thesis: Oxygen isotope, cathodoluminescence, and titanium in quartz geothermometry in the Alta Stock, UT—Geochemical insights into pluton assembly and early cooling history

22. 2009, M.S., Melinda Hilber, Thesis: Tracking fluid/melt flow in lower crustal mafic gneiss using zircon isotopic zoning, Kapuskasing Uplift

23. 2012, PhD, Kristie McLin, Thesis: Evaluating fluid-rock interactions in geothermal and contact metamorphic systems

24. 2014, M.S., Patrick Loury, Thesis: Metamorphism and fluid-rock interaction in the Alta, Utah contact aureole: Identification of forsterite reaction pathways, evaluation of reaction overstepping, and trace element characterization

25. 2016, M.S., Thomas Etzel, Thesis: Oxygen Isotope Composition and Tourmaline Mineral Chemistry of the Coso and Darajat Geothermal Systems

B. PAST STUDENTS—COMMITTEE MEMBER (49 students): Hassan Al-Janobi, Brenda Beitler, David Bowling, Anita Brown, Jonathan Caine, Henrietta Cathey (M.S. and Ph.D.), Harrison Crecraft, Mike Davis (PhD), Micheal DePhangher, Jeff Fitzmayer, Daniel Hall, Neil Hanshaw, Ron Hansen, Bronson Hawley, David Hedderly-Smith, Stephen Hill, Hugh Klein, Joong-Jeek Lee, Richard Lippoth, Kevin Mahon, Andrew Manning, Tom Marston, Melissa Masbruch (Ph.D), Stan Morrison, Dave Norman, Terry Pavlis, Bill Phelps, Roxanna Platon, John Porter (Ph.D), Sally Potter, Ricardo Presnell (Ph.D), Jay Quade, Rhuebottom, Ryan Rowland, Amy Sheldon, Robert Sobocinski, Michael Stearns, Bert Stolp (PhD), Xiwen Sun, JunYoung Sung, Sergio Rodriques Tapio, Jacob Trauscht, Pei Fen Tsai, Steve van der Hoven, Yang Wang, Chris Wilkowski, Paula Wilson (M.S,, Ph.D), William A. Yonkee, Pheng Fei Zhang

C. CURRENT STUDENTS

Advisor

Carl Beno (Ph.D.), Clay Jones (Ph.D)

Committee Member

Samantha Couper

Ke Li

Feng Lin

Chris Volk

**TEACHING RESPONSIBILITIES - PAST AND PRESENT**

Past

GG111-Physical Geology: 1977-78, 1978-79, 1979-80, 1985-86, 1987-88, 1988-89, 1996-97, 1997-98

GG512-Metamorphic Petrology: 1976-77, 1977-78, 1978-79, 1979-80, 1980-81, 1981-82, 1982-83, 1983-84, 1984-85, 1985-86, 1987-88, 1988-89, 1989-90, 1990-91, 1991-92, 1992-93, 1995-96

GG566-Geochemistry: 1978-79, 1994-95, 1995-96, F-2004

GG567-Isotope Geology: 1976-77, 1978-79, 1979-80, 1980-81, 1981-82, 1982-83, 1983-84, 1984-85, 1986-87, 1987-88, 1988-89, 1989-90, 1990-91, 1991-92, 1993-94, 1994-95, 1996-97,

GG 101-Introduction to Geology,1977-78,

GG 568-Petrological Phase Equilibria: 1979-80, 1980-81, 1981-82, 1982-83, 1985-86, 1989-90, 1990-91, 1991-92, 1992-93,

GG 592-Special Topics: Applications of Stable Isotope to Petrogenesis (1983-84)

GG 511-Igneous Petrology: 1985-86,

GG 309-Introductory Igneous and Metamorphic Petrology :1989-1990, 1990-91, 1991-92, 1992-93, 1993-94, 1994-95, 1995-96, 1996-97,

GG612-Advanced Metamorphic Processes: S-1993, S-1996

GG1110-Introduction to Earth Systems: F-1998, F-2000, F-2001, F-2002, F-2003, F-2004, F-2005, F-2007, F-2008, F-2009, F-2010, F-2011, F-2012, F-2013, F-2014, F-2017

GG2100—Reactive Earth: F-2018, F-2019

GG5670--Isotope Tracers: F-1998, F-2000, F-2002, S-2005, F-2007, F-2009, F-2012, F-2014, F-2016

GG3090--Earth Materials II: S-1999, S-2000, S-2003, S-2004, S-2005, S-2006, S-2008, S-2009, S-2010, S-2011, S-2012, S-2013, S-2014, S-2015, S-2016, S-2018, F-2018

GG3095--Petrology for Engineers:S-1999, S-2000,

GG4100--Petrography and Petrogenesis: F-1998

GG5120--Geochemical Reaction and Transport:F-1998, F-2001, F-2003, F-2005, F-2011, F-2013, F-2015, F-2017, F-2018

GG1007—Unstable Ground: S-2001, S-2002, S-2003

GG6920—Reviews in Earth Science (MSSST cohort): S-2016, F-2019

GG6950—Reviews in Earth Science: F-2008, F-2015

Present

GG5670— Isotope Tracers

NOTE: ADDITIONAL TEACHING ACTIVITIES:

In 1991, I took responsibility for teaching the Department’s core course in undergraduate petrology, a course required of all of our majors. I completely redesigned all of the laboratories and much of the lecture material of the course to emphasize modern petrologic theory, petrogenetic processes, observations, and problem-solving skills. This required considerable effort on my part, but as a result, the course was perceived to be significantly more valuable by students, as indicated by student evaluations.

In September, 1997 I developed and led a seven-day field trip to the Cascades Volcanic Province in Washington and Oregon. The trip was partially funded by a grant from the University Teaching Committee. The objectives of the trip were to provide students with an opportunity to see first-hand an excellent example of an important type of geologic plate boundary, to improve students' observational and problem-solving skills, and to collect samples of calc-alkaline volcanic suites to improve our teaching collections. Another objective was to reestablish a tradition of major Department-scale field trips; the Department had not taken such a major field trip in a number of years. Twenty-five students and faculty went on the trip, and the consensus was that the trip was a great success.

In 1997-1998 I chaired the Curriculum Revision committee which resulted in the development of a new suite of core courses for all of our undergraduate majors that have been taught from academic year 1998-99 until this past Fall, 2018.

In academic year 2000-2001 I designed a new course—**GG1007, Unstable Ground**—that was taught for the first time in Spring, 2001. This course was specifically designed as part of the University’s new cluster course concept, and will be part of the Western Landscapes cluster. It will also count as a science foundation course for the University Intellectual Explorations requirement. **Unstable Ground** emphasizes how geologic processes determine the subsurface geologic structure, topography (landscape), and climate of the West, characteristics which in turn have been fundamental in influencing the exploration, development, and culture of the West. The course illuminates these connections by exploring historical and contemporary examples of human interaction with the earth and environment, and how earth science provides the basic framework to address problems and issues related to the West. The course utilizes new visual materials and in-class problem-solving, along with field trips, to provide students with valuable experience in observations and problem-solving skills. Such experience is valuable for any intellectual endeavor, not just for careers in science.

In Fall semester, 2017, I taught the last 5 weeks of GG4100, Petrography and Petrogenesis, after Frank Brown unexpectedly passed away in October.

Curriculum Revision, 2016-19. I have taken an active role in the department discussions on curriculum revision the last several years. I took the lead role in design of the first half of the new core course Reactive Earth, GEO 2100. In Fall, 2018, I taught the first half of the inaugural offering of GEO 2100 and prepared all of the course materials for the first half of this new core course. Together with Sarah Lambart, I have also given considerable time and thought to development of the new required petrology course for undergraduate majors in the geoscience emphasis, GEO 3050 (Petrology and Petrogenesis). This effort has included acquisition and documentation of new rock sample suites for this course. This development work is ongoing, and includes inspection of thin sections of pre-existing research collections to identify rock samples for these new teaching collections. We will then have additional thin sections made of the selected samples for this new course.

#### UNIVERSITY AND COLLEGE COMMITTEE SERVICE

Convocation Committee for the College of Mines and Mineral Industries and College of Engineering, Joint Convocation, 1978,1979

College Loan Committee, (Member), 1979-80, 1980-81, 1981-82, 1982-83

Library Policy Advisory Committee, (Member), 1983-84, 1984-85, 1985-86, 1986-87, 1989-90

College Loan Committee, (Member), 1983-84, 1984-85

College Curriculum Committee, 1986-87 (Member)

Publications Council (Member), 1989-90

Academic Senate (Member) 1990-91, 1991-92, 1992-93, 2008-09, 2009-10, 2010-11

Personnel and Election Committee, 1990-91, 1991-92, 1992-93

Library Policy Advisory Committee (Chair), 1991-92, 1992-93

Red Butte Garden Advisory Committee, 1996-97

University Teaching Committee, 2001-2002

College Faculty Relations Committee 1993-94, 1994-95, 1999-2000 (Chair), 2000-2001 (Chair), 2002-2003, 2003-2004, 2010-2011, 2016-2017, 2017-18, 2018-19

College Diversity and Inclusivity Committee (member) 2018-19

Intellectual Explorations Science Area Committee, 2003-2006

University Community and Government Relations, 2002-2005

University Promotion and Tenure Advisory Committee, 2003-2006

#### DEPARTMENT COMMITTEE SERVICE

1976-77

Academic Affairs Committee (Member)

Graduate Affairs Committee (Member)

1977-78

Undergraduate Affairs Committee (Member)

1978-79

Undergraduate Affairs Committee (Member)

Teaching Resources Committee (Member)

1979-80

Undergraduate Affairs Committee (Member)

Seminar Committee (Chairman)

1980-81

Graduate Affairs Committee

1981-82

Graduate Affairs Committee

Undergraduate Affairs Committee

Geology Special Funds Committee

1982-83

Graduate Affairs Committee (Chairman)

1983-84

Graduate Affairs Committee (Chairman)

1984-85

Graduate Affairs Committee (Chairman)

1985-86

Academic Affairs Committee

1986-87

Academic Affairs Committee

Field Course Committee

Geology Instruments Advisory Committee

1987-88

Graduate Affairs Committee

Geology Instruments Advisory

1988-89

Undergraduate Affairs Committee

Seminar (Spring) Committee

Geology Instruments Advisory Committee

1989-90

Seminar (Winter) Committee

1990-91

Safety Committee

1991-92

Safety Committee

Seminar (Winter) Committee

1992-93

Graduate Affairs Committee

Safety Committee

1993-94

Graduate Affairs Committee

Safety Committee

1994-95

Undergraduate Affairs Committee (Chair)

1995-96

Undergraduate Affairs Committee (Chair): This committee spent considerable time and energy developing a new undergraduate core curriculum for our four majors in anticipation of the University's conversion to a semester calender.

1996-97

Undergraduate Affairs Committee (Chair): This committee spent considerable time and energy developing a new undergraduate core curriculum for our four majors in anticipation of the University's conversion to a semester calender.

1997-1998

Undergraduate Affairs Committee (Chair): This committee spent considerable time and energy coordinating the conversion of our undergraduate degree programs to the semester calender.

1998-1999

Undergraduate Affairs Committee

Distinguished Lecture Series Coordinator (Spring, 1999)

1999-2000

Graduate Affairs Committee (Chair)

2000-2001

Graduate Affairs Committee (Chair)

2001-2002

Graduate Affairs Committee (Chair)

2002-2003

Facilities Committee

2003-2004

Distinguished Lecture Series Coordinator (Fall Semester)

2004-2005

Undergraduate Affairs (member)

Ad Hoc Committee on Increasing GEO Majors (chair): This committee initiated discussion on streamlining the Department’s B.S. majors and on creation of a new B.A. major in the Spring of 2005.

2005-2006

Ad Hoc Committee on Increasing GEO Majors (chair): This committee continued discussions from the previous Spring. The committee submitted preliminary recommendations for streamlining the B.S. majors and for a new B.A. degree that were submitted to the Undergraduate Affairs committee for further discussion.

Undergraduate Affairs (member)

Strategic Plan Committee

Ad Hoc Committee on Increasing GEO Majors (chair)

Dept. Web Page Committee

2006-2007

On sabbatical

2007-2008

Undergraduate Affairs (member), Collections Committee

2008-2009

Undergraduate Affairs; Collections; Instrumentation and Safety

2009-2010

Undergraduate Affairs; Collections; Instrumentation and Safety

2010-2011

Undergraduate Affairs; Collections; Instrumentation and Safety

2011-2012

Undergraduate Affairs; Collections; Instrumentation and Safety

2012-2013

Undergraduate Affairs; Collections; Space

2013-2014

Graduate Affairs, Distinguished Lecture Series

2014-2015

Undergraduate Affairs, Strategic Planning

2015-2016

Undergraduate Affairs, Strategic Planning, Search Committee (chair) for Igneous Processes faculty vacancy

2016-2017

Retention, Promotion & Tenure comm. Chair; Search Committee (chair) for Igneous Processes faculty vacancy

2017-2018

Retention, Promotion & Tenure comm. Chair; Curriculum Committee

#### EXTERNAL COMMITTEES

1996-2000: Salt Lake Community College (SLCC) Natural Science Advisory Committee--Chair

Statewide Geology Coordination Group

#### RECENT EXTERNALLY-FUNDED RESEARCH GRANTS

1992-1995: Replacement of mass spectrometer and improvement of stable isotopic facilities: Principal Investigator; Granting Agency--National Science Foundation (**NSF**); Award--$268,000 (with matching funds from University of Utah).

1993-1996: Quantitative evaluation of fluid flow and mass/energy transport during contact metamorphism--Continuing studies of the Alta Stock thermal aureole: Principal Investigator (Dan Barnett, Co-investigator); Granting Agency--**NSF**; Award--$120,000.

1992-1995: Stable isotopic studies of fluid flow during low pressure regional metamorphism in an accretionary complex, Eastern Chugach Mountains, Alaska: Principal Investigator; Granting Agency--**NSF**; Award--$134,000.

1999-2000: Stable and radioactive isotope monitoring of groundwater flow and solute transport in the Southwest Jordan Valley, Utah: Co-Investigator (with Dr. Kip Solomon, Principal Investigator); Granting Agency--**Kennecott Copper Corporation**; Award--$100,500.

1999-2003: Integrated geochemical analysis and numerical modeling of hydrothermal processes associated with contact metamorphism in the Alta Stock thermal aureole: Principal Investigator; Granting Agency--**NSF**; Award--$256,000.

2005-2009: Modeling Multi-Phase Fluid-Rock Interactions in the Shallow Crust: Principal Investigator; Granting Agency—**Petroleum Research Fund (PRF)**; Award--$80,000.

2005-2010: Testing for ‘Wet’ (Rapid) Oxygen Diffusion in Igneous and Metamorphic Zircon during Regional Metamorphism: Co-Principal Investigator (w/ Desmond Moser); Granting Agency--**NSF**; Award--$230,000.

2012-December, 2014: Innovative Computational Tools for Reducing Exploration Risk through Integration of Water-Rock Interactions and Magnetotelluric Surveys: Co-Principal Investigator w/ Joe Moore, Phil Wannamaker; Granting Agency—**DOE,** Grant #DE-EE0005521; Award—total ~$900,000 [my part (petrology, geochemistry), including funding of Tom Etzel, M.S. student; about $250,000].

2014-June, 2015: Evaluation of boron isotopes as a tracer of fluid-rock interaction in crustal hydrothermal systems. Funding Incentive Seed Grant, University of Utah, $33,000.

2019-2022: RUI: Collaborative Research: What are the mechanisms and timescales of contact metamorphism in long-lived magmatic and hydrothermal systems? Michael Stearns, PI (Utah Valley University); John Bowman and John Bartley, Co-PI’s. Submitted to NSF August, 2018. University of Utah budget is $205,800. Notified on December 6, 2018 by Jennifer Wade, Program Director for Petrology and Geochemistry at NSF that our proposal would be funded. **Project was activated May 1, 2019**.

Recently submitted (and rejected) proposals

Development of sample preparation and characterization facilities to support earth and materials science research: Co-Principal Investigator with Barbara Nash: Submitted July, 2010: Amount requested: $176,240.

Identifying a key mechanism of early continent formation using age, lithium and oxygen isotope zoning in lower crustal zircons: Principal Investigator: Submitted July, 2011: Amount requested: $268,519.

Infiltration-driven metamorphism in marbles: The Alta, Utah Aureole as a natural laboratory to investigate reaction pathways, reaction overstepping, and oxygen isotope transport and exchange: Principal Investigator: Submitted July, 2013: Amount requested: $249,437

Fluid-rock interaction and contact metamorphism in an evolving magmatic-hydrothermal system at The Geysers geothermal field, California: Submitted January 2015 to National Science Foundation. Amount requested: $315,916

Did incremental emplacement of the Little Cottonwood Stock drive contact metamorphism of the Alta contact aureole: Co-Principal Investigator with Mike Stearns and John Bartley: Submitted July, 2016: Amount requested: $312,000.

Comparative Analogues for Stage III: Time-dependent Studies of Basalt Glass Core from Surtsey Volcano and Simulant Waste Glasses Emplaced in the Same Borehole: Marie Jackson, PI. Submitted January 23, 2018 to DOE-NEUP (Nuclear Energy University Programs); NEUP DE-FOA-0001772, FC-1.3b Advanced Waste Forms. $522,450. I would be an unfunded scientific collaborator with Dr. Jackson on a part of this project dealing with *in-situ* (SIMS) and other oxygen isotope studies of glass alteration.

Current Research Grants

2019-2022: RUI: Collaborative Research: What are the mechanisms and timescales of contact metamorphism in long-lived magmatic and hydrothermal systems? Michael Stearns, PI (Utah Valley University); John Bowman and John Bartley, Co-PI’s. Submitted to NSF August, 2018. University of Utah budget is $205,800. Notified on December 6, 2018 by Jennifer Wade, Program Director for Petrology and Geochemistry at NSF that our proposal would be funded. **Project was activated May 1, 2019**.

# Pending Proposals