VITA

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Education

Virginia Polytechnic Institute and State University	1977	B.S. Geology
Virginia Polytechnic Institute and State University	1978	M.S. Geology
University of Chicago	1981	Ph.D. Geology

Professional Experience

Director, Lowell Institute for Mineral Resources, 2017-
Interim Director, School of Mining and Mineral Resources, 2021
Associate Director, Lowell Institute for Mineral Resources, 2009-2016
Director, Center for Mineral Resources, University of Arizona, 1996-2008
Professor, Department of Geosciences, University of Arizona, 1993-
Adjunct Professor, Department of Mining & Geological Engineering, University of Arizona, 2004-
Associate Professor, Department of Geosciences, University of Arizona, 1990-1993
Associate Professor, Department of Earth and Space Sciences, U.C.L.A., 1988-1990
Assistant Professor, Department of Earth and Space Sciences, U.C.L.A., 1984-1988
Postdoctoral Fellow, Geophysical Laboratory, 1981-1983
Geologist, U. S. Geological Survey, 1980

Honors & Fellowships (1990-)

Society of Economic Geologists, International Exchange Lecturer (1999-2000)
Lindgren Award, Society of Economic Geologists (1992)
Mineralogical Society of America Award (1991)

Principal Grants & Contracts (2010-) [does not include additional Lowell Institute funding]

SMMR facilities funding, $544,000, equipment for shared mineral characterization lab (2023-24) PI
ABOR-TRIF grant, $3,557,279 for critical minerals in copper mine tailing (2024-26) co-PI
Freeport-McMoRan, $1,200,000 for studies of porphyry copper systems (2023-2027) PI / now co-PI
ABOR-TRIF grant, $575,330 for assessment of Arizona abandoned mine lands (2022-25) PI
SMMR facilities funding, $950,000 for shared mineral characterization lab (2022-23) PI
SMMR seed grants, $75,000 for pilot study of critical element in porphyry deposits (2021-23) PI
Resolution Copper, $40,000 for study of Cretaceous units at Resolution (2020-22) PI
Keck Foundation, $1M for study of paleofluid flow in the Paradox Basin (2018-21) co-PI
NSF Grant, $99,000 for study of U, Fe, and hydrocarbon mobility (2019-21) co-PI
(many industry gifts & grants totaling ~$2.8M for projects slated between 2013-20) PI
Science Foundation Arizona, ~$18,200,000 for Institute for Mineral Resources (2008-13) co-PI
NSF Grant, $209,000 for origins of brine-dominated hydrothermal alteration (2009-11) PI
U.S. Geological Survey Grant, $50,000 for study of trace elements in IOCG systems (2011-12) PI
U.S. Geological Survey Grant, $15,064 for study of SE CA IOCG systems (2010-11) PI
U.S. Geological Survey Grant, $110,112 for study of Jurassic metallogeny (2008-10) PI
Freeport-McMoRan, $78,120 for study of IOCG vein systems, Chile (2008-10) PI

Membership in Professional Societies

Geological Society of America, Fellow
Mineralogical Society of America, Fellow
Society for Geology Applied to Ore Deposits
Society of Economic Geologists, Fellow
Society for Mining, Metallurgy and Exploration
Arizona Geological Society

Teaching

Graduate advisees: 72 graduated (23 PhD, 37 MS, 12 PSM), 12 current (3 PhD, 2 MS, 7 PSM)
Undergraduate teaching: physical geology, field geology (summer field), introductory petrology, mineralogy, mineral deposits, geochemistry
Graduate teaching: field geology, geological thermodynamics, geochemistry of mineral deposits; seminars in igneous and metamorphic petrology, geochemistry, and mineral deposits; 10-day professional courses in advanced mapping, mineral deposit types, structural geology for exploration and mine geologists

Principal Service

Director, UA Lowell Institute for Mineral Resources (2017-; Assoc. Dir. 2009-2016)
Interim Director, UA School of Mining and Mineral Resources (2022)
Director, UA Center for Mineral Resources (1994-2008)
APLU Association of Public and Land-grant Universities, Board on Natural Resources, Section on Mineral and Energy Resources (2004-) past chair
NSF Panel Member (2010) and reviewer since
Graduate Admissions Committee (1990-5); University Advisory Committee on Promotion & Tenure, 1994; Promotion and Tenure (1995-7); Graduate Policy Committee; Chair of Mineralogy search (1994-5), Lowell Chair search (2000-1), Performance Evaluation Committee (2003-5, 2020-22), P&T committee (2022-23), Director Search UA Mineral Museum (2022-23), Director Search SMMR (2021-23), Lowell Chair Search (2023-24),
National Research Council, 1986-1989 (Geodynamics Committee), 1998-2000 (Committee on Basic Research Opportunities in the Earth Sciences), 2016-2017 (Committee on Lead Apportionment in Superfund Sites)
Editorial Board, Economic Geology (1988-92; 1999-2003); Editorial Board, Geology (1995-7)
Geological Society of America, Committee on Nominations (1992), Donath Award (2013-)
Mineralogical Society of America, Nominating Committee (1992), Committee on Short Courses 1992-1995 (co-chair, 1994-95), Counselor (1995-1997), Roebling Committee (chair 1995-1996)
Society of Economic Geologists, Student Affairs Committee (1991-3, Committee on Committees 1994-1995; Lindgren Committee (1995-1997, chair 1996-1997; chair 2013-15), Organizer 2001 Annual Meeting Symposium ("Fe-oxide(-Cu-Au) Systems: Deposit studies to Global Context"); SEG Publications Board (2001-2003), Thayer Lindsley Committee (2003-2006)

Bibliography of M. D. Barton

Papers

1. Barton, M. D., Kieft, C., Burke, E. A. J., and Oen, I. S., 1978, Uytenbogaardtite, a new silver-gold sulfide: Canadian Mineralogist, v. 16, p. 651-659.
2. Barton, M. D., 1980, The Ag-Au-S system: Economic Geology, v. 75, p. 303-317.
3. Barton, M. D., 1982, The thermodynamic properties of topaz solid solutions and some petrologic applications: American Mineralogist, v. 67, p. 956-974.
4. Barton, M. D., Haselton, H.T., Hemingway, B. S., Kleppa, O. J. and Robie, R. A., 1982, The thermodynamic properties of fluor-topaz: American Mineralogist, v. 67, p. 350-355.
5. Hemingway, B. S., Barton, M. D., Robie, R. A. and Haselton, H. T., Jr., 1986, The heat capacities and thermodynamic functions for beryl, $Be_3Al_2Si_6O_{18}$, phenakite, Be_2SiO_4, euclase, $BeAlSiO_4(OH)$, bertrandite, $Be_4Si_2O_7(OH)_2$, and chrysoberyl, $BeAl_2O_4$: American Mineralogist, v. 71, p. 557-568.
6. Barton, M. D., 1986, Phase equilibria and thermodynamic properties of minerals in the system BeO-Al_2O_3-SiO_2-H_2O, with petrologic applications: American Mineralogist, v. 71, p. 277-300.
7. Sorensen, S. S. and Barton, M. D., 1987, Metasomatism and partial melting in a subduction complex: Catalina Schist, southern California: Geology, v. 15, p. 115-118.Barton, M. D., 1987, Lithophile-element mineralization associated with Late Cretaceous two-mica granites in the Great Basin: Geology, v. 15, p. 337-340.
8. Robie, R. A., Zhao Bin, Hemingway, B. S., and Barton, M. D., 1987, Heat capacity and thermodynamic properties of andradite garnet, $Ca_3Fe_2Si_3O_{12}$, between 10 and 1000 K and revised values for $\Delta G^{\circ}_{f,298}$ of hedenbergite and wollastonite: Geochimica et Cosmochimica Acta, v. 51, p. 2219-2224.
9. Barton, M. D., 1987, Lithophile-element mineralization associated with Late Cretaceous two-mica granites in the Great Basin. *Geology*, *15*(4), 337-340.
10. Barton, M. D., Battles, D. A., Bebout, G. E., Capo, R. C., Christensen, J. N., Davis, S. R., Hanson, R. B., Michelsen, C. J., and Trim, H. E., 1988, Mesozoic contact metamorphism in the western United States, in W.G. Ernst, ed., Metamorphism and Crustal Evolution, Western Conterminous United States: Rubey Volume VII, Prentice-Hall, Englewood Cliffs, New Jersey, p. 110-178.
11. Zhao, B., and Barton, M. D., 1988, Compositional characteristics of garnets and pyroxenes in contact-metasomatic skarn deposits and their relationship with metallization: Chinese Journal of Geochemistry. v. 7(4), p. 329-335.
12. Hanson, R. B., and Barton, M. D., 1989, Thermal development of low-pressure metamorphic belts: Results from two-dimensional numerical models: Journal of Geophysical Research, v. 94, p. 10,363-10,377.
13. Barton, M. D., and Hanson, R. B., 1989, Magmatism and the development of low-pressure metamorphic belts: Implications from the western United States and thermal modeling: *Geological Society of America Bulletin*, v. 101, p. 1051-1065.
14. Bebout, G. E., and Barton, M. D., 1989, Fluid flow and metasomatism in a subduction zone hydrothermal system: Catalina Schist terrane, California: *Geology*, v. 17, p. 976-981.
15. Barton, M. D., 1990, Cretaceous magmatism, mineralization and metamorphism in the east-central Great Basin: in J. L. Anderson, "The Nature and Origin of Cordilleran Magmatism," *Geological Society of America Memoir* 174, p. 283-302.
16. Miller, C. F., and Barton, M. D., 1990, Phanerozoic granitoids of the inner Cordillera of the western United States: in S. M. Kay and C. W. Rapela, "Plutonism from Antarctica to Alaska," *Geological Society of America Special Paper* 241, p. 213-232.
17. Ernst, W. G., Hacker, B. R., Barton, M. D., and Sen, G., 1991, Igneous petrogenesis of magnesian metavolcanic rocks from the central Klamath Mountains, northern California: *Geological Society of America Bulletin*, v. 103, p. 56-72.
18. Barton, M. D., and Trim, H. E., 1991, Late Cretaceous two-mica granites and lithophile-element mineralization in the Great Basin: in Schafer, R. W., and Wilkinson, W. H., eds., Geology and Ore Deposits of the Great Basin, Geological Society of Nevada Symposium Proceedings, Geological Society of Nevada, 529-538.

19. Trim, H. E., and Barton, M. D., 1991, Contrasting types of igneous-related mineralization in the Kern Mountains, White Pine County, Nevada: in Schafer, R. W., and Wilkinson, W. H., eds., Geology and Ore Deposits of the Great Basin, Geological Society of Nevada Symposium Proceedings, Geological Society of Nevada, 579-581.
20. Barton, M. D., Staude, J.-M., Johnson, D. A., and Snow, E.A., 1991, Aureole systematics: in Kerrick, D. M., Contact Metamorphism, *Reviews in Mineralogy* 26, p. 723-847.
21. Barton, M. D., Ilchik, R. P., and Marikos, M. A., 1991, Metasomatism: in Kerrick, D. M., Contact Metamorphism, *Reviews in Mineralogy* 26, p. 321-350.
22. Sorensen, S. S., Bebout, G. E., and Barton, M. D., 1991, A field guide to the geology, petrology, and geochemistry of the Catalina Schist on Santa Catalina Island: Evidence for fluid-rock interaction, thermal evolution, and metasomatic alteration in a paleosubduction zone: in M. J. Walawender, and B. B. Hanan, eds., Geological Excursions in southern California and northern Mexico: Guidebook, 1991 Annual Meeting Geological Society of America, p. 272-296.
23. Tobisch, O. T., Barton, M. D., Vernon, R. H., and Paterson, S. R., 1991, Fluid-enhanced deformation: Transformation of granitoids to banded ultramylonites, western Sierra Nevada, California, and southeastern Australia: *Journal of Structural Geology*, v. 13, p. 1137-1156.
24. Hacker, B. R., Ernst, W. G., and Barton, M. D., 1992, Metamorphism of magnesian volcanic rocks, central Klamath Mountains, northern California: *Journal of Metamorphic Geology*, v. 10, 55-69.
25. Hanson, R. B., Sorensen, S. S., Barton, M. D., and Fiske, R. S., 1993, Long-term evolution of fluid-rock interactions in magmatic arcs: Evidence from the Ritter Range pendant, Sierra Nevada, California, and numerical modeling: *Journal of Petrology*, v. 34, p. 23-62.
26. Bebout, G. E., and Barton, M. D., 1993, Metasomatism during subduction: Products and possible paths in the Catalina Schist, California: *Chemical Geology*, v. 108, 61-92.
27. Wallace, T.C., Barton, M.D., and Wilson, W.E., 1994, Silver and silver-bearing minerals: *Rocks and Minerals*, v. 69, p. 16-38.
28. Christensen, E. H., Kowallis, B. J., and Barton, M. D., 1994, Temporal and spatial distribution of volcanic ash in Mesozoic sedimentary rocks of the western interior: An alternative record of Mesozoic magmatism: in M.V. Caputo, J.A. Peterson, K.J. Franczyk eds., Mesozoic Systems of the Rock Mountain Region, USA, S.E.P.M. Rocky Mountain Section SEPM, 73-94.
29. Barton, M. D., Staude, J.-M. G., Zürcher, L., and Megaw, P. K. M., 1995, Porphyry copper and other intrusion-related mineralization in Mexico: in F.W. Peirce and J.G. Bolm, editors, Porphyry Copper Deposits from Alaska to Chile, *Arizona Geological Society Digest* v. 20, 487-524.
30. Battles, D.A., and Barton, M.D., 1995, Arc-related sodic hydrothermal alteration in the western US: *Geology*, v. 23, 913-916.
31. Barton, M. D., and Johnson, D. A., 1996, An evaporitic-source model for igneous-related Fe-oxide(-REE-Cu-Au-U) mineralization: *Geology*, v. 24, p. 259-262.
32. Barton, M .D., 1996, Granitic magmatism and metallogeny of southwestern North America: *Transactions of the Royal Society of Edinburgh, Earth Sciences*, v. 87, 261-280. [also: Special Paper Geological Society of America. 315; Pages: 261-280]
33. Ilchik, R. P., and Barton, M. D., 1996, Physical and chemical constraints for an amagmatic origin of Carlin-type gold deposits: A source-sink approach: in Coyner, A.R., and Fahey, P.L., eds., Geology and Ore Deposits of the American Cordillera, Geological Society of Nevada, p. 687-708.
34. Ilchik, R. P., and Barton, M. D., 1997, Evaluation of an amagmatic origin for Carlin-type gold deposits: *Economic Geology*, v. 92, p. 269-288.
35. Megaw, P. K. M., Barton, M. D., and Islas-Falce, Jorge, 1997, Carbonate-hosted lead-zinc (Ag, Cu, Au) deposits of northern Chihuahua, Mexico: Special Publication 4, Society of Economic Geologists, p. 277-289.
36. Sorensen, S. S., Dunne, G. B., Hanson, R. B., Barton, M. D., Becker, J., Tobisch, O. T., and Fiske, R. S., 1998, From Jurassic shores to Cretaceous plutons: Alteration and metamorphism of volcanic rocks of the Cordilleran arc: *Geological Society of America Bulletin*, v. 110, p. 326-343.
37. Megaw, P. K. M., and Barton, M. D., 1999, The geology and minerals of Cerro de Mercado, Durango, Mexico: *Rocks and Minerals*, v. 74, p. 20-28.
38. Gleason, J. D., Marikos, M. A., Barton, M. D., and Johnson, D. A., 2000, Neodymium isotopic study of rare earth element sources and mobility in hydrothermal Fe-oxide(-P-REE) mineral deposits: *Geochimica et Cosmochimica Acta*, v. 64(6), p. 1059-1068.

39. Barton, M. D., and Johnson, D. A., 2000, Alternative brine sources for Fe-oxide(-Cu-Au) systems: Implications for hydrothermal alteration and metals: in T. M. Porter (editor), Hydrothermal iron oxide copper-gold and related deposits a global perspective, Australian Mineral Foundation, Glenside, South Australia, p. 43-60.
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41. Barton, M. D., 2000, Guide for Field Trip Day 1: Birch Creek, White Mountains, California: in Dilles, J. H., Barton, M. D., Johnson, D. A., Proffett, J. M., and Einaudi, M. T., editors, 2000, Contrasting Styles of Intrusion Associated Hydrothermal Systems: Society of Economic Geologists Guide Book Series, v. 32, p. 27-43.
42. Dilles, J. H., Barton, M. D., Johnson, D. A., Proffett, J. M., and Einaudi, M. T., editors, 2000, Contrasting Styles of Intrusion Associated Hydrothermal Systems: Society of Economic Geologists Guide Book Series, v. 32, 162 p.
43. Barton, M. D., Dilles, J. H., Marco T. Einaudi, M. T., Johnson, D. A., 2000, Contrasting Styles of Intrusion-Associated Hydrothermal Systems – A Preface: in Dilles, J. H., Barton, M. D., Johnson, D. A., Proffett, J. M., and Einaudi, M. T., editors, 2000, Contrasting Styles of Intrusion Associated Hydrothermal Systems: Society of Economic Geologists Guide Book Series, v. 32, p. 1-7.
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45. Jensen, E. P., and Barton, M. D., 2000, Gold deposits related to alkaline magmatism: Reviews in Economic Geology, v. 13, 279-314.
46. Johnson, D. A. and Barton, M. D., 2000, Guide for Field Trip Day 4: Buena Vista Hills, Humboldt mafic complex, western Nevada: in Dilles, J. H., Barton, M. D., Johnson, D. A., Proffett, J. M., and Einaudi, M. T., editors, 2000, Contrasting Styles of Intrusion Associated Hydrothermal Systems: Society of Economic Geologists Guide Book Series, v. 32, p. 127-144.
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48. Staude, J.-M. G., and Barton, M. D., 2001, Metallogeny of northwestern Mexico: Bulletin of the Geological Society of America, v. 113, 1357-1374.
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50. Zürcher, L., Ruiz, J. and Barton, M.D., 2001, Paragenesis, element distribution, and stable isotopes at the Peña Colorada iron skarn, Colima, Mexico: Economic Geology, v. 96(3), p. 535-557.
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52. Bebout, G.E. and Barton, M.D., 2002, Tectonic and metasomatic mixing in a high-T, subduction-zone melange; insights into the geochemical evolution of the slab-mantle interface: Chemical Geology, v. 187(2), 79-106.
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56. Zürcher, L., Kring, D. A., Barton, M. D., Dettman, D., and Rollog, M., 2005, Stable isotope record of post-impact fluid activity in the core of the Yaxcopoil-1 borehole, Chicxulub impact structure, Mexico, in Kenkmann, T., Hörz, F., and Deutsch, A., eds., Large Meteorite Impacts III, Geological Society of America Special Paper 384, p. 223–238.
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58. Ducea, M. N., and Barton, M.D., 2007, Igniting flare-up events in Cordilleran arcs: Geology, v. 35(11), p. 1047-1050.
59. Jensen, E. P., and Barton, M. D., 2008, Geology, petrochemistry and time-space evolution of the Cripple Creek district, Colorado: Geological of America Field Guide 10, p. 63-78.
60. Inverno, C. M. C., Solomon, M., Barton, M. D., and Foden, J., 2008, The Cu-stockwork and massive sulfide ore of Feitais volcanic-hosted massive sulfide deposit, Aljustrel, Iberian Pyrite Belt, Portugal: A mineralogical, fluid inclusion, and isotopic investigation: *Economic Geology*, v. 103(1), p. 241-268.
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63. Pal, D. C., Barton, M. D., and Sarangi, A. K., 2009, Using texture and composition of pyrite in metamorphosed ore: an example from Turamdih U-Cu deposit, Singhbhum shear zone, eastern India: *Mineralium Deposita*, v.44, p. 61-80.
64. Hitzman, M., Dilles, J., Barton, M. and Boland, M., 2009, Mineral resource geology in academia: An impending crisis? GSA Today, v. 19(8), p. 26-28.
65. Barton, M. D., 2009, IOCG deposits: A Cordilleran perspective: in P. J. Williams (ed.), Smart Science for Exploration and Mining, James Cook University, Townsville, Australia, p. 5-7.
66. Kreiner, D. C., and Barton, M. D., 2009, Hydrothermal alteration and mineralization zoning in iron oxide(-Cu-Au) vein deposits near Copiapó, Chile: in P. J. Williams (ed.), Smart Science for Exploration and Mining, James Cook University, Townsville, Australia, p. 635-637.
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74. Fay, I., and Barton, M.D., (2012) Alteration and ore distribution in the Proterozoic Mines Series, Tenke-Fungurume Cu-Co district, Democratic Republic of Congo: Mineralium Deposita, v. 47, p. 501-519.
75. Barton, M.D., Johnson, D.A., Kreiner, D.C., and Jensen, E.P., 2013, Vertical zoning and continuity in Fe oxide(-Cu-Au-Ag-Co-U-P-REE) (or 'IOCG') systems: Cordilleran insights: Proceedings of the 12th Biennial Meeting, Society for Geology Applied to Ore Deposits, p. 1348-1351. [invited paper]
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