

# Jeffrey D. Vervoort

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<b>Education</b>	<p><b>Ph.D.</b> Cornell University, Ithaca NY, 1994. Thesis title: "Isotopic Evolution of the Archean Mantle: Evidence from the Abitibi Greenstone Belt."</p> <p><b>Master of Science</b> in Geology. University of Minnesota-Duluth, Duluth, MN, 1987. University of Montana, Missoula, MT, 1981-82. Course work in Geology.</p> <p><b>Bachelor of Arts.</b> University of Wisconsin, Madison, WI, 1978. Zoology/English.</p>
<b>Experience</b>	<p><b>Professor</b> August 2013 - present School of the Environment, Washington State University</p> <p><b>Associate Professor</b> August 2007 - 2013 School of Earth and Environmental Sciences, Washington State University</p> <p><b>Visiting Professor</b> September 2008 - May 2009 Laboratoire de Sciences de la Terre,Ecole Normale Supérieure de Lyon</p> <p><b>Assistant Professor</b> August 2002 - August 2007 Department of Geology, Washington State University</p> <p><b>Senior Research Associate</b> October 2000 - August 2002.</p> <p><b>Research Associate</b> November 1992 - October 2000. Department of Geosciences, University of Arizona. Radiogenic isotope geochemistry; Geochronology; Geochemistry of the crust and mantle; Precambrian geology and geochemistry.</p>
<b>Analytical Experience</b>	<p>Multicollector ICP-MS (Washington State, Finnigan Neptune; Arizona, Micromass Isoprobe; Lyon, France, VG P54). Developmental and applied work in various isotopic systems: Lu, Hf, Sm, Nd, U, Th, Pb, Rb, Sr, Cu, Zn, Fe, Mo, Ca.</p> <p>Laser-ablation ICP-MS analysis (New wave Nd-YAG 213 nm laser and Finnigan Element 2 HR-ICPMS, Washington State; Eximer laser with Isoprobe MC-ICPMS, Arizona). Laser ablation U-Pb zircon geochronology.</p> <p>Thermal Ionization Mass Spectrometer (Arizona, VG 354, VG Sector 54; Cornell, VG Sector). Lu, Hf, Sm, Nd, U, Th, Pb, Rb, Sr, Yb analysis.</p> <p>Inductively Coupled Plasma Mass Spectrometer (Cornell, Arizona, Washington State). Trace-element analysis.</p> <p>Clean laboratory design and application for isotope geochemistry.</p> <p>Instrumental Neutron Activation: Trace-element analysis.</p>
<b>Grants</b>	<p><b>National Science Foundation Grants</b></p> <p>"MRI: Acquisition of a laser-ablation, multi-collector ICP-MS for research and training in Earth, Environmental, and Anthropological Sciences." J.D. Vervoort, PI, Washington State University, \$597,778. 2016-2017.</p> <p>"Collaborative Research: The Building of a Continent: The Archean to Proterozoic Growth and Modification of Western Laurentia." J.D. Vervoort, PI, Washington State University, \$219,576. 2014-2017.</p> <p>"Collaborative Research: Early Earth Evolution: Hf and Nd Isotopic Constraints from the ca 3.4-&gt;4.0 Ga Acasta Gneisses" J.D. Vervoort, PI, Washington State University, \$187,564. 2013-2016.</p> <p>"MRI: Acquisition of a Thermal Ionization Mass Spectrometer (TIMS) to strengthen collaborative inter-University programs in isotope geochemistry". Brian Kennedy, lead PI, Univ. Idaho; J.D. Vervoort, PI , Washington State University, 2011-2014, \$763,076.</p> <p>"Collaborative Research: Dating Subduction Zone Metamorphism: Testing the Effect of Pressure-Temperature Path on Lawsonite Lu-Hf Geochronology". J.D. Vervoort, PI , Washington State University, 2011-2013, \$48,530.</p>

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### **Grants (*continued*) National Science Foundation Grants**

- "Age and composition of the East Antarctic shield by isotopic analysis". J. Goodge, PI, University of Minnesota-Duluth, 2010-2013. Subaward to J. Vervoort, Washington State University, \$51,029.
- "Collaborative Research: Constraining the Formation and Evolution of the Proterozoic Orogenic Belt of the SW USA Based on Geochronology of Garnet and Accessory Minerals". J.D. Vervoort, PI, Washington State University, 2010-2013, \$97,405.
- "Collaborative Research: Deformation and Magmatic Modification of a Steep Continental Margin, Western Idaho-eastern Oregon". J.D. Vervoort, PI, Washington State University, 2009-2014, \$243,839.
- "Technician Support (Years 4 and 5) for Radiogenic Isotope and Geochronology Facility, Washington State University". J.D. Vervoort, lead PI, Washington State University, 2007-2009. \$90,000.
- "Collaborative Research: Genesis of Primitive, High-Sr Lavas in the Western Aleutians". J.D. Vervoort, PI, Washington State University, 2007-2010. \$18,389.
- "Collaborative Research: Constraining the Timing and Nature of Proterozoic Metamorphism in the Northwest U.S. Cordillera". J.D. Vervoort, PI, Washington State University, 2007-2010. \$167,077.
- "Collaborative Research: Testing Theories of Synconvergent Extension in the Hinterland of the Sevier Orogen". J.D. Vervoort, PI, Washington State University, 2006-2010. \$67,940.
- "Collaborative Research: Testing Models of Mesozoic Arc Collision and Accretion in the Northwest U.S. Cordillera, Eastern Oregon, Using Sedimentary Provenance and Basin Analysis". J.D. Vervoort, PI, Washington State University, 2006-2009. \$132,000.
- "Technician support (Phase I) for MC-ICPMS isotope facility, Washington State University". J.D. Vervoort, lead PI; Washington State University 2005-2008. \$225,000.
- "The Lu-Hf composition of the Earth, and implications for the future of Hf isotope geochemistry". J.D. Vervoort, PI, Washington State University. 2004-2006. \$56,291.
- "High field strength elements and Hf-Nd isotope systematics in Aleutian lavas: Implications for conservative element behavior in subduction zones". J.D. Vervoort, Principal Investigator, Washington State University. 2003-2005. \$142,427.
- "Isotopic and trace-element geochemistry of globally subducting sediments". J.D. Vervoort, Principal Investigator, Washington State University. 2002-2005. \$129,949.
- "Radiogenic isotopic studies of magmatism and crust-mantle evolution". PJ Patchett and J.D. Vervoort, Principal Investigators, University of Arizona. 2001-2002. \$210,000.
- "Magmatic evolution of the Midcontinent Rift System: Constraints from the layered and felsic series of the Duluth Complex". J.D. Vervoort, PI, Univ. Arizona. 1999-2001. \$48,906.
- "Chemical evolution of Archean mantle and crust: constraints from Hf, Nd and Pb isotopes". J.D. Vervoort and PJ Patchett, PIs, Dept. of Geosciences, Univ. Arizona. 1999-2001.
- "Hafnium isotopic approaches to Precambrian crust-mantle evolution". PJ Patchett and J.D. Vervoort, PIs, Dept. of Geosciences, University of Arizona. 1996-1998. \$270,000.
- "Hafnium isotopes and Precambrian crust-mantle evolution". P. Jonathan Patchett, PI, Dept. of Geosciences, University of Arizona. 1994-1995. \$175,000.
- "A Pb and Nd Isotope Study of the Footwall Rocks of the Noranda and Matagami Cu-Zn Sulfide Deposits, Quebec". William M. White, PI, Cornell University. 1990-1992. \$105,000.

### **Professional Awards**

Fellow of the American Geophysical Union, 2016.

Fellow of the Geological Society of America, 2011.

### **Synergistic and Outreach Activities**

Co-convener of special session "Using sediments to understand the evolution of the Earth", Annual Fall AGU Meeting, San Francisco, California, December 2014.

Co-convener of special session "Accretionary and planetary differentiation processes as recorded in early Earth and planetary materials", Annual Fall AGU Meeting, San Francisco, California, December 2014.

Member of AGU's VGP Macelwane Award committee, 2013-2015

Co-Chair of the Rocky Mountain/Cordilleran Section Meeting of the Geological Society of America, May 2014. 2013-2014

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### **Synergistic Activities (continued)**

Co-Chair of Theme, "Continental Crust", International Program Committee for the Goldschmidt 2014 meeting. 2013-2014

Geochemical Society representative to Mineralogical Society of America for reviews of proposals for short courses and RiMG (Reviews in Mineralogy and Geochemistry) volumes. 2012-present.

Member of the Joint Technical Program Committee, Geological Society of America, 2012-2016.

Co-convener of special session "Origin and Evolution of the Earth's Crust", Joint EGU-AGU Meeting, Vienna, Austria, April 2012.

Member of the Program Committee of the Geochemical Society, 2011-2015.

Featured as career of the month in the *Science Teacher*, a monthly journal for secondary science teachers.

Co-convener of special session "Origin and Evolution of the Earth", Annual Fall AGU Meeting, San Francisco, California, December 2011.

Contributor to New York Times "Scientist at Work" series featuring reports of geological research during Antarctic field season, December 2010-January 2011.

Contributor to BBC Mundo "En fotos: Antártica, un continente escondido bajo el hielo", January 2011.

Co-instructor of short course "U-Pb Geochronology and Hf isotope geochemistry applied to detrital minerals", Annual GSA Meeting, Denver, Colorado, October 30, 2010.

Co-convener of special session "Innovative Techniques and Applications for Detrital Thermo- and Geochronologic Data", Annual GSA Meeting, Denver, Colorado, October 31, 2010.

Co-convener of special session "Chemical evolution of the mantle: Timing and tempo?", Annual Fall AGU Meeting, San Francisco, California, December 2009.

Co-convener of special session "Thirty Years of Mantle Recycling", Annual Fall AGU Meeting, San Francisco, California, December 2008.

Co-convener of special session "Sedimentary Constraints on Composition and Evolution of the Continents, Continental Reconstructions and Basin Evolution", 18th Annual V. M. Goldschmidt Conference, Vancouver, British Columbia, Canada, July 2008.

Co-convener of special session "High Field Strength Elements and their isotopes as tracers for geological and planetary processes", 8th Annual V. M. Goldschmidt Conference, Vancouver, British Columbia, Canada, July 2008.

EarthChem Working Group on Data Reporting Standards, Lamont-Doherty Earth Observatory of Columbia University, April 2007-present.

Workshop on Teaching Analytical Techniques in the Geosciences, Bozeman, MT, March 2007.

NSF Earth Sciences Proposal Review Panel, Petrology and Geochemistry, Spring 2006.

American Geophysical Union-VGP Education and outreach committee, 2004-7.

American Geophysical Union-VGP committee for Union awards, 2004-6.

Local Organizing Committee for V.M.Goldschmidt Meeting, Moscow, ID, May 2005.

Convener of scientific session "Isotope Records of Early Planetary Evolution", 2005 V. M. Goldschmidt Conference, Moscow, ID.

Workshop on "Linking information systems in marine and terrestrial geosciences; sediment geochemistry", Washington D.C., June 2004

Participant in ISES (Integrated Solid Earth Sciences) Forum, Seattle WA, November, 2003.

### **University Service**

2016-present: Search committee chair, Geology revitalization

2014-2015: Search committee chair, Structure/Tectonics Faculty position

2012-present: CAS Grants Review Committee

2012-present: CAS Strategic Planning Committee

2012-2013: COS awards recognition committee

2011-2012: COS undergraduate curriculum committee

2011-2012: Synergistic Opportunities committee

Spring 2012: Organize department colloquium

Spring 2010: Organize department colloquium

Fall 2009: Organize department colloquium

Spring 2008: Organize department colloquium

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### ***University Service (continued)***

Spring 2007: Organize department colloquium  
2006-2007: Search committee, Geophysics position  
Fall 2006: Organize department colloquium  
2003-2006: Curriculum committee  
2004-2005: Search committee, Introductory Geology Instructor  
2003-2004: Search committee, Geohydrologist position  
2003-2004: Search committee, Lab manager position  
Fall 2003: Organize department colloquium  
Spring 2003: Organize department colloquium

### ***Professional Memberships***

American Geophysical Union  
Geological Society of America  
Geochemical Society  
American Association for the Advancement of Science  
European Geosciences Union  
European Association of Geochemistry

### ***Publications***

#### ***Peer Reviewed Papers***

*Citations in brackets [citations in 2016/total citations] (859 citations in 2016, 6606 total citations; compiled January 31, 2017 from Web of Science; Google Scholar total citations 9033)*

- Tikoff, B., Vervoort, J., Hole, J.A., Russo, R., Gaschnig, R., and Fayon, A., 2017. Introduction: EarthScope IDOR project (deformation and magmatic modification of a steep continental margin, western Idaho-eastern Oregon) themed issue. *Lithosphere*, 9, 151-156. DOI: 10.1130/L628.1. [0/0]
- \*Fisher, C.M., Hanchar, J.M., Miller, C.F., Vervoort, J.D., and Whitehouse, M.J., 2017. Combining Nd isotopes in monazite and Hf isotopes in zircon to understand complex open-system processes in granitic magmas. *Geology*, v. 45, 267-270. DOI: 10.1130/G38458.1. [0/0]
- \*Naidoo, T., Zimmerman, U., Vervoort, J., and Tait, J., In press, published on line in 2017. The elusive snowball earth: U-Pb zircon ages from the upper diamictite of the Gifberg Group, South Africa. *J. African Earth Sciences*. [0/0]
- Gaschnig, R., Macho, A.S., Fayon, A., Schmitz, M., Ware, B.D., Vervoort, J., Kelso, P., LaMaskin, T.A., Kahn, M.J., and Tikoff, B., 2017, Intrusive and depositional constraints on the Cretaceous tectonic history of the southern Blue Mountains, eastern Oregon: *Lithosphere*, 9, 265-282, DOI: 10.1130/L554.1. [0/0]
- \*Bauer, A.M., \*Fisher, C., Vervoort, J.D., and Bowring, S., 2017, Coupled zircon Lu-Hf and U-Pb isotopic analyses of the oldest terrestrial crust, the >4.03 Ga Acasta Gneiss Complex. *Earth and Planetary Science Letters*, 458, 37-48. DOI: 10.1016/j.epsl.2016.10.036. [0/0]
- \*Braudy, N., Gaschnig, R.M., Wilford, D., Vervoort, J.D., Nelson, C.L., Davidson, C., Kahn, M.J., and Tikoff, B., 2017, Timing and deformation conditions of the western Idaho shear zone, West Mountain, west-central Idaho. *Lithosphere*, 9, 157-183. DOI: 10.1130/L519.1. [0/0].
- Gaschnig, R.M., Vervoort, J.D., Tikoff, B., and Lewis, R.S., 2017, Construction and preservation of batholiths in the northern U.S. Cordillera: *Lithosphere*, 9, 315-324, DOI: 10.1130/L497.1. [0/0]
- Schmidt, K.L., Lewis, R.S., Vervoort, J., Stetson-Lee, T.A., Michels, Z.D., and Tikoff, B., 2017, Tectonic evolution of the Syringa embayment in the central North American Cordilleran Accretionary boundary. *Lithosphere*, 9, 184-204. DOI: 10.1130/L545.1. [0/0]
- Cao, H., Vervoort, J., Wang, D., Li, GX, Neill, O. 2016. Triassic monazite ages and its geological significance of garnet-mica schist in Fenzishan Group, Jiaobei Massif. *Acta Petrologica Sinica*. 32, 3800-3816. [0/0]
- \*Bustamante, C., Archanjo, C.J., Cardona, A., and Vervoort, J., 2016, Late Jurassic to Early Cretaceous plutonism in the Colombian Andes: A record of long-term arc maturity. *Geol. Soc. Amer. Bull.*, 128, 1762-1779. DOI: 10.1130/B31307.1 [0/0]
- \*Laskowski, A.K., Kapp, P., Vervoort, J., and Ding, L., 2016, High-pressure Tethyan Himalaya rocks along the India-Asia suture zone in southern Tibet. *Lithosphere*, 8, 574-582. DOI: 10.1130/L544.1

*\*indicates graduate student or post-doctorate co-author*

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- Elliot, D.H., Larsen, D., Fanning, C.M., Fleming, T.H., and Vervoort, J.D., 2016, The Lower Jurassic Hanson Formation of the Transantarctic Mountains: implications for the Antarctic sector of the Gondwana plate margin. *Geological Magazine*, Pub. Date 2016/7, 1-27. DOI.org/10.1017/S0016756816000388.[0/0]
- Zapata, S., Cardona, A., Jaramillo, C., Valencia, V., and Vervoort, J., 2016, U-Pb LA-ICP-MS geochronology and geochemistry of Jurassic volcanic and plutonic volcanic rocks from the Putumayo region (Southern Columbia): Tectonic setting and regional correlations. *Boletín de Geología*, 38, 21-38. [2/2]
- \*Stevens, L.M., Baldwin, J.A., Crowley, J.L., \*Fisher, C.M., and Vervoort, J.D., 2016, Magmatism as a response to exhumation of the Priest River complex, northern Idaho: Constraints from zircon U-Pb geochronology and Hf isotopes. *Lithos*, 262, 285-297. DOI: 10.1016/j.lithos.2016.07.006. [0/0]
- \*Padilla, A.J., Miller, C.F., Carley, T.L., Economos, R.C., Schmitt, A.K., Coble, M.A., Wooden, J.L., \*Fisher, C.M., Vervoort, J.D., and Hanchar, J.M., 2016, Elucidating the magmatic history of the Austurhorn silicic intrusive complex (southeast Iceland) using zircon elemental and isotopic geochemistry and geochronology. *Contributions to Mineralogy and Petrology*. v. 171, article 69. DOI: 10.1007/s00410-016-1279-z. [0/0]
- \*Aronoff, R.F., Andronicos, C.L., Vervoort, J.D., and \*Hunter, R.A., 2016, Redefining the metamorphic history of the oldest rocks in the southern Rocky Mountains. *Geol. Soc. America Bulletin*. 128, 1207-1227. DOI: 10.1130/B31455.1. [0/0]
- Cheng, H., Liu, X.C., Vervoort, J.D., Wilford, D., and Cao, D.D., 2016, Micro-sampling Lu-Hf geochronology reveals episodic garnet growth and multiple high-P metamorphic events. *J. Met. Petrology*, 34, 363-377. DOI: 10.1111/jmg.12185. [2/2]
- Naidoo, T., Zimmermann, U., and Vervoort, J., 2016, Pre-Pampean metasedimentary rocks from the Argentinian Puna: Evidence for the Ediacaran margin of Gondwana or the Arequipa-Antofalla-West Pampeanas block. *Jour. S. Amer. Earth Sci.*, 280, 139-146. DOI: 10.1016/j.precamres.2016.05.009 [0/0]
- Vervoort, J.D., and Kemp, A.I.S., 2016, Clarifying the zircon Hf isotope record of crust-mantle evolution, *Chemical Geology*. 425, 65-75. doi: 10.1016/j.chemgeo.2016.01.023. [3/3]
- Vervoort, J., Lewis, R., Gaschnig, R., Jansen, A., Fisher, C., and Brewer, R., 2016, Neoarchean and Paleoproterozoic crystalline basement rocks of north-central Idaho: Constraints on the formation of western Laurentia. *Geol. Soc. Am. Bull.* 128, 94-109. DOI: 10.1130/B31150.1. [3/3]
- Cao, H., Cong, Y., Li, G., Xu, C., Vervoort, J., Kylander-Clark, A. 2015. Constrain multistage deformation using garnet Lu-Hf and monazite U-Pb dating: A case study of Tuolemuchaung, North Qilian. *Acta Petrologica Sinica*. 31, 3755-3768. [1/1]
- Cheng, H., Liu, Y.M., and Vervoort, J.D., 2015. Combined U-Pb, Lu-Hf, Sm-Nd and Ar-Ar multichronometric dating on the Bailang eclogite constrains the closure timing of the Paleo-Tethys Ocean in the Lhasa terrane, Tibet. *Gondwana Research*. 28, 1482-1499. DOI: 10.1016/j.gr.2014.09.017. [5/6]
- Kelly, E.D., Hoisch, T.D., Wells, M.L., Vervoort, J.D., and Beyene, M.A. 2015., An Early Cretaceous garnet pressure-temperature path recording synconvergent burial and exhumation from the hinterland of the Sevier orogenic belt, Albion Mountains, Idaho. *Contributions to Mineralogy and Petrology*. 170, 1-22. DOI: 10.1007/s00410-015-1171-2. [1/2]
- \*Cruz-Uribe, A.M., Hoisch, T.D., Vervoort, J.D., Wells, M.L., and Mazdab, F.K., 2015., Linking thermodynamic modeling, Lu-Hf geochronology, and trace elements in garnet: New P-T-t paths from the Sevier hinterland. *Journal of Metamorphic Geology*. 33, 763-781. DOI: 10.1111/jmg.12151. [2/5]
- LaMaskin, T.A., Dorsey, R.J., and Vervoort, J.D., 2015., Westward Growth of Laurentia by Pre-Late Jurassic Terrane Accretion, Eastern Oregon and Western Idaho, United States. *Journal of Geology*. 123, 233-267. DOI: 10.1086/681724. [5/5]
- Kemp, A.I.S., Hickman, A.H., Kirkland, C.L., and Vervoort, J.D., 2015, Hf isotopes in detrital and inherited zircons of the Pilbara Craton provide no evidence for Hadean continents. *Precambrian Research*. 261, 112-126. DOI: 10.1016/j.precamres.2015.02.011. [9/12]
- Yogodzinski, G.M., Brown, S.T., Kelemen, P.B., Vervoort, J., Portnyagin, M., Sims, K., Hoernle, K., Hauff, F., 2015, The Role of Subducted Basalt in the Source of Island Arc Magmas: Evidence from Seafloor Lavas of the Western Aleutians. *Journal of Petrology*, 56, 441-492. DOI: 10.1093/petrology/egv006. [6/9]
- Yakymchuk, C., Brown, M., Clark, C., Korhonen, F.J., Piccoli, P.M., Siddoway, C.S., Taylor, R.J.M. and Vervoort, J.D., 2015, in press. Decoding polyphase migmatites using geochronology and phase equilibria modelling. *Journal of Metamorphic Geology*. 33, 203-230. DOI: 10.1111/jmg.12117. [6/8]

- Cheng, H. and Vervoort, J.D., 2015. Combined geochemistry and geochronology constrains coupled subduction of oceanic and continental crust in the Huwan shear zone, central China. *American Mineralogist*. 100, 181-194. DOI: 10.2138/am-2015-4982. [0/1]
- \*Ibanez-Mejia, M., Gehrels, G.E., Ruiz, J., and Vervoort, J.D., 2014, Small-volume baddeleyite ( $ZrO_2$ ) U-Pb geochronology and Lu-Hf isotope geochemistry by LA-ICP-MS. Techniques and applications. *Chemical Geology*, 384, 149-167. DOI: 10.1016/j.chemgeo.2014.07.011. [3/7]
- Zapata, S., Cardona, A., Montes, C., Valencia, V., Vervoort, J., Reiners, P., 2014, Provenance of the Eocene Soebi Blanco Formation, Bonaire, Leeward Antilles: Correlations with post-Eocene tectonic evolution of northern South America. *Journal of South American Earth Sciences*. 52, 179-193. DOI: 10.1016/j.jsames.2014.02.009. [2/2]
- Mulcahy, S.R., Vervoort, J.D., and Renne, P.R., 2014, Dating subduction-zone metamorphism with combined garnet and lawsonite Lu-Hf geochronology. *J. Metamorphic Geol.*, 32, 515-533. doi:10.1111/jmg.12092. [4/8]
- Hoisch, T.D., Wells, M.L., \*Beyene, M.A., \*Styger, S., and Vervoort, J.D., 2014., Jurassic Barrovian metamorphism in a western U.S. Cordilleran metamorphic core complex, Funeral Mountains, California. *Geology*, 42, 399-402. [1/3]
- \*Konstantinou, A., Wirth, K.R., Vervoort, J., Malone, D.H., Davidson, C.. and Craddock, J.P., 2014. Provenance of Quartz Arenites of the Early Paleozoic Midcontinent Region, USA. *Journal of Petrology*, 122, 201-216. 10.1086/675327 [4/5]
- \*Fisher, C.M., Vervoort, J., and Hanchar, J., 2014. Guidelines for reporting zircon Hf isotopic data by LA-MC-ICPMS and potential pitfalls in the interpretation of these data. *Chem. Geol.* 363, 125-133. DOI: 10.1016/j.chemgeo.2013.10.019. [18/30]
- Mulcahy, S.R., Roeske, S.M., McClelland, W.C., Ellis, J.R., Jourdan, F., Renne, P.R., Vervoort, J.D., Vujojovich, G.I., 2014, Multiple migmatite events and cooling from granulite facies metamorphism within the Famatina arc margin of northwest Argentina. *Tectonics*, 33, 1-25. DOI: 10.1002/2013TC003398. [1/5]
- \*Fisher, C.M., Vervoort, J., and DuFrane, A., 2014. Accurate Hf isotope determinations of complex zircons using the "laser ablation split stream" method. *Geochem. Geophys. Geosyst.* 15, 121-139. DOI: 10.1002/2013GC004962. [10/14]
- Konstantinou, A., Valley, J., Strickland, A., Miller, E., \*Fisher, C.M., Vervoort, J., and Wooden, J., 2013. Geochemistry and geochronology of the Jim Sage volcanic suite, southern Idaho: Implications for Snake River Plain magmatism and its role in the history of Basin and Range extension. *Geosphere*. 6, 1681-1703. DOI: 10.1130/GES00948.1 [1/6]
- Craddock, J.P., Rainbird, R.H., Davis, W.J., Davidson, C., Vervoort, J.D., \*Konstantinou, A., Boerboom, T., \*Vorhies, S., \*Kerber, L., \*Lundquist, B., 2013, Detrital Zircon Geochronology and Provenance of the Paleoproterozoic Huron (similar to 2.4-2.2 Ga) and Animikie (similar to 2.2-1.8 Ga) Basins, Southern Superior Province. *Journal of Geology*. 121, 623-644. DOI: 10.1086/668635. [1/4]
- \*Konstantinou, A., Strickland, A., Miller, E., Vervoort, J., \*Fisher, C.M., Wooden, J., Valley, J., 2013. Syn-extensional magmatism leading to crustal flow in the Albion-Raft River-Grouse Creek metamorphic core complex, northeastern Basin and Range. *Tectonics*. 32, 1384-1403. DOI: 10.1002/tect.20085. [1/7]
- \*Zirakparvar, N.A., Baldwin, S.L., and Vervoort, J.D., 2013, The Origin and Geochemical Evolution of the Woodlark Rift of Papua New Guinea, *Gondwana Research*. 23, 931-943. doi.org/10.1016/j.gr.2012.06.013. [0/13]
- Cheng, H., \*Zhang, C., Vervoort, J.D., and Zhou, Z., 2013. New Lu-Hf and Sm-Nd geochronology constrains the subduction of oceanic crust during the Carboniferous-Permian in the Dabie orogen. *J. Asian Earth Sci.* 63, 139-150. DOI: 10.1016/j.jseaes.2012.04.012. [0/11]
- \*Furlanetto, F., Thorkleson, D., Gibson H.D., Marshall D.D., Rainbird R.R., Davis W.J., Crowley J., and Vervoort, J., 2013, Late Paleoproterozoic terrane accretion in northwestern Canada and the case for circum-Columbian orogenesis. *Precambrian Research*. 224, 512-528. DOI: 10.1016/j.precamres.2012.10.010. [3/16]
- \*Gaschnig, R.M., Vervoort, J.D., Lewis, R. and Tikoff, B., 2013, Probing for Proterozoic and Archean crust in the northern US Cordillera with inherited zircon from the Idaho batholith. *Geol. Soc. Am. Bull.* 125, 73-88. doi:10.1130/B30583.1. [4/10]
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*Publications (continued)*

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- Vervoort, Jeff., 2014, Lu-Hf Dating: The Lu-Hf Isotope System, *Encyclopedia of Scientific Dating Methods*. Springer Science, Dordrecht. DOI 10.1007/978-94-007-6326-5\_46-1. [1/1]

### *Maps published*

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#### **Book Review**

Vervoort, Jeff., 2004, Book Review: Geochemistry: pathways and processes, 2nd edition. Columbia University Press, New York, Meteoritics and Planetary Science, volume 39, number 9, p. 1599-1600.

#### **Field Guides**

- LaMaskin, T.A., Schwartz, J.J., Dorsey, R.J., Snoke, A.W., Johnson, K., and Vervoort, J.D., 2009, Mesozoic sedimentation, magmatism, and tectonics in the Blue Mountains Province, northeastern Oregon, in O'Connor, J.E., Dorsey, R.J., and Madin, I.P., eds., Volcanoes to Vineyards: Geologic Field Trips through the Dynamic Landscape of the Pacific Northwest: Geological Society of America Field Guide 15, doi: 10.1130/2009.fld015(09).
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- Shaw, C.A., Lageson, D.R., Tikoff, B., and Vervoort, J., 2014, Exploring the Northern Rocky Mountains Foreword. Geological Society of America Field Guide. Vol. 37, p. V-VIII DOI: 10.1130/2014.0037(00)

#### **Recent invited symposia presented**

##### **2016 (1)**

The growth and evolution of Earth's earliest crust. Boise State University. April 2016.

##### **2015 (1)**

The growth and evolution of Earth's earliest crust. University of Minnesota, January 2015.

##### **2014 (6)**

The growth and evolution of Earth's earliest crust. University of Wyoming, November 2014.

The Precambrian Crystalline Basement of Northwest Laurentia: Constraining the Formation and Evolution of North America. GSA Annual meeting, Vancouver, British Columbia, October 2014

Evolution of the Depleted Mantle and Growth of the Continental Crust: An early beginning or a slow start? EGU General Assembly, Vienna, Austria, April 2014.

The growth and evolution of Earth's earliest crust. American Museum of Natural History, New York, April 2014.

Using new chronologic and isotopic tools to constrain the early geological history of western North America, University of Nevada, Reno, March 2014.

The Lu-Hf isotope system, MIT lecture, February 2014.

##### **2013 (2)**

The growth and evolution of Earth's earliest crust, University of Grenoble, Grenoble, France, March 2013.

Garnet Geochronology: Promise and Pitfalls, GSA Annual meeting, Denver, CO, October 2013.

##### **2012 (3)**

Hf-Nd isotopic composition of marine sediments, University of British Columbia, December, 2012

Origin and Evolution of the Continental Crust, Louisiana State University, March 2012.

Searching for Terra Australis Incognita: the nature of the continent at the bottom of the world, Louisiana State University, March 2012.

##### **2011 (4)**

Origin and Growth of the Continental Crust, Cornell University, INSTOC symposium on crustal evolution, September 2011.

Using new chronologic and isotopic tools to constrain the geological evolution of western North America., University of Kansas, April 2011.

Searching for Terra Australis Incognita: the nature of the continent at the bottom of the world, Washington State University Vancouver, March 2011.

Searching for Terra Australis Incognita: the nature of the continent at the bottom of the world, Washington State University Environmental Science Series, February 2011.

##### **2010 (3)**

Unraveling the early history of the Earth with radiogenic isotopes, Tongji University, Shanghai, China, May 2010.

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## **Jeff Vervoort**

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### *Invited talks (continued)*

Unraveling the early history of the Earth with radiogenic isotopes, Cornell University, April 2010.

Unraveling the early history of the Earth with radiogenic isotopes, University of Minnesota, Duluth, March 2010.

#### **2009 (9)**

Using new chronologic and isotopic tools to unravel the geologic evolution of the Northwest U.S., University of Montana, September 2009.

Integrated Nd and Hf View of Mantle Evolution, University of Grenoble, Grenoble, France, February 2009.

The isotopic evolution of the early Earth: the perspective from Hf, Nd, and Pb isotopes, ETH (Eidgenössische Technische Hochschule) Zürich, Zürich, Switzerland, February, 2009

The isotopic evolution of the early Earth: the perspective from Hf, Nd, and Pb isotopes, Ecole Normale Supérieure de Lyon, Lyon, France, February, 2009.

The isotopic evolution of the early Earth: the perspective from Hf, Nd, and Pb isotopes, University of Geneva, Geneva, Switzerland, April, 2009.

Integrated Nd and Hf View of Mantle Evolution, University of Clermont-Ferrand, Clermont-Ferrand, France, February 2009.

Integrated Nd, Hf, and Pb View of Mantle Evolution, GEUS (De Nationale Geologiske Undersøgelser for Danmark og Grønland), Copenhagen, Denmark, January 2009.

The isotopic evolution of the early Earth: the view according to "les plombiers", Universität Münster, Münster, Germany, January, 2009.

#### **2008 (1)**

Using new chronologic and isotopic tools to constrain the geological evolution of North America, Western Washington University, May 2008.

### *First Author Abstracts (presentations at professional meetings)*

#### *(61 first author presentations; over 340 total presentations)*

Vervoort, J.D., Kemp, A., Fisher, C., and Bauer, A., 2016, Development of the depleted mantle reservoir and growth of the continental crust begins at ~ 3.8 Ga., 35th International Geological Congress, Cape Town, S. Africa, Aug. 2016.

Vervoort, J.D., Lewis, R.S., Fisher, C.M., Baldwin, J.A., Wang, D., Jansen, A.C., Nesheim, T.O., Zirakparvar, N.A., 2016, Geochronologic and Hf isotope constraints on the formation and evolution of the Clearwater and southern Priest River complexes, northern Idaho-eastern Washington. GSA Rocky Mountain Section Meeting, Moscow, ID, May 2016 Geological Society of America Abstracts with Programs. Vol. 48, No. 6.

Vervoort, J.D., Fisher, C.M., Lewis, R.S., Baldwin, J.A., Wang, D., Jansen, A., Nesheim, T.O., Zirakparvar, N.A., McDonie, C., and Gaschnig, R.M., 2016, Evidence for Neoarchean to Proterozoic crustal formation and modification in the northern U.S. Cordillera. GSA Annual Meeting, Denver. GSA Abstr. W. Prog., Vol. 48, No. 7.

Vervoort, J., Kemp, A., Fisher, C., Bauer, A., and Bowring, S., 2015, The Rock Record Has It About Right—No Significant Continental Crust Formation Prior to 3.8 Ga. AGU Fall meeting 2015, San Francisco. Abstract V43D-05.

Vervoort, J., Fisher, C., Kemp, A., Bauer, A., and Bowring, S., 2015, Growth of Continental Crust Begins in Earnest at ~3.8 Ga. Goldschmidt Abstracts, 2015 3261. Annual V.M. Goldschmidt Conference, Prague, Czech Republic, August, 2015.

Vervoort, J., Kemp, A., Bauer, A., Bowring, S., Fisher, C., 2104, An impaired view of Earth's early history. AGU Fall meeting 2014, San Francisco. Eos Trans. AGU, v. 95, Fall Meet. Suppl.

Vervoort, J., Fisher, C.M., Lewis, R., Wang, D., Jansen, A., and Gaschnig, R.M., 2014, The Precambrian crystalline basement of northwest Laurentia: constraining the formation and evolution of North America. Geological Society of America Abstr. w Programs. Vol. 46, No. 6, p.827. Paper No. 344-1.

Vervoort, J., Lewis, R., Fisher, C., Gaschnig, R., Jansen, A., and Wang, D., 2014, The Clearwater complex: Uncovering the Neoarchean and Paleoproterozoic basement of north-central Idaho, Geol. Soc. America Rocky Mountain and Cordilleran Joint Mtg., 2014. Geol. Soc. America Abstr w Prog. Vol. 46, No. 5, p.20. Paper No. 9-4

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- Vervoort, J., Ramsey, M.J., Aleinikoff, J.N., and Southworth, S., 2013, Contrasting Lu-Hf and Sm-Nd ages in garnetiferous gneisses of the Blue Ridge Province, Virginia: Implications for the timing and duration of the Grenville orogeny in the Central Appalachians. *Geol. Soc. Am. Abstr. w Prog., Vol. 45, Paper 322-5.*
- Vervoort, J., 2013, Garnet geochronology: Promise and pitfalls. *Geol. Soc. Am. Abstr. w Prog., Vol. 45, Paper 211-1.*
- Vervoort, J., Fisher, C.M., and Kemp, A., 2013, The Myth of a Highly Heterogeneous Hf-Nd Eoarchean Mantle and Large Early Crustal Volumes. Annual V.M. Goldschmidt Conference, Florence, Italy, August, 2013.
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- Vervoort, J.D., 2011, Evolution of the Depleted Mantle--Revisited. *Eos Trans. AGU, v. 92, Fall Meet. Suppl.*
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- Vervoort, J., Blichert-Toft, J., and Albarede, F., 2011, The Pb age of the Earth from Neoarchean galenas. Annual V.M. Goldschmidt Conference, Prague, Czech Republic, August 2011.
- Vervoort, J.D., 2010, Hf analysis in zircon by LA-MC-ICPMS: Promise and pitfalls, *Geological Society of America Abstracts with Programs, Vol. 42, No. 5, p. 667.*
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- Vervoort, J.D., Zirakparvar, N.A., Lewis, R.S., and Burmester, R.F., 2007, Evidence for recurrent Paleoproterozoic magmatism and metamorphism in the Boehls Butte-Clarkia area, North-Central Idaho, USA, *Geol. Soc. Amer. Abs. with Programs, Vol. 39, No. 6, p. 245, October 2007.*
- Vervoort, J.D., Plank, T., Patchett, P.J., and Prytulak, J., 2007, Hf and Nd isotopic composition of sediments, old and new. *17th Annual V.M. Goldschmidt Conference, Cologne, Germany, August 2007, Geochim. et Cosmochim. Acta, v. 71 (15), p. A1065. [0/1]*
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- Vervoort, J.D., and Wirth, K.R., 2004, Origin of the rhyolites and granophyres of the Midcontinent Rift, Northeast Minnesota, 50<sup>th</sup> Annual meeting of the Institute for Lake Superior Geology, Proceedings and Abstracts, v. 50, p.158-9, Duluth, Minnesota, May 2004.
- Vervoort, J.D., Patchett, P.J., and Söderlund, U., 2003, The Coupled Hf-Nd Perspective on Crust-Mantle Evolution, *Eos. Trans. AGU*, v. 84, p. F1533, December 2003.
- Vervoort, J.D., Söderlund, U., and Patchett, P.J., 2003, The Lu-Hf and Sm-Nd isotopic composition of chondrites: implications for determining the Hf-Nd isotopic composition of Bulk Silicate Earth. In 4<sup>th</sup> Annual Geochemical Earth Reference Model Workshop, Lyon, France, May, 2003.
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- Vervoort, J.D., Plank, T., and Patchett, P.J., 2001, Hf-Nd isotopic and trace-element geochemistry of global subducting sediments. *EOS*, v. 82, p. F1364-1365, December 2001.
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- Vervoort, J.D., Patchett, P.J., Blichert-Toft, J., and Albarède, F., Downes, H. and Rudnick, R., 2000, Hf-Nd isotopic evolution of the lower crust: evidence from xenoliths. *EOS*, v. 81, p. F1249, December 2000.
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- Vervoort, J.D. and Isachsen, C.E., 1999, An integrated approach to unraveling Earth's early isotopic record. *EOS*, v. 80, p. F1191, December 1999.
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- Vervoort, J.D., Patchett, P.J., Blichert-Toft, J., and Albarède, F., 1998, Hf-Nd isotopic covariance in the crust and mantle and constraints on the evolution of the depleted mantle. *Mineralogical Magazine*, v. 62A, p. 1595-1596. Eighth Annual V.M. Goldschmidt Conference, Toulouse, France, August 1998.
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- Vervoort, J.D. and Green, J.C., 1995, Origin of evolved magmas in the Midcontinent Rift System, NE Minnesota: Nd isotope evidence for melting of Archean crust. IGCP Project 336 Mtg., Duluth, MN., Aug. 1995.
- Vervoort, J.D., Patchett, P.J., Gehrels, G.E., and Baadsgaard, H., 1994, Depleted mantle evolution as defined by Hf isotopic data from concordant zircons. EOS, vol. 75, Dec. 1994.
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### *Academic Advisors:*

- P. Jonathan Patchett, University of Arizona (post-doctoral advisor)  
William M. White, Cornell University (PhD thesis advisor)  
John C. Green, University of Minnesota at Duluth (MS thesis advisor)