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Professional Preparation:

University of Puget Sound, Tacoma WA Environmental Economics B.A. 1976
University of Colorado, Boulder, CO Geological Sciences M.Sc. 1994

Appointments:

Manager, INSTAAR Stable Isotope Lab, University of Colorado, 1994 to present
Graduate Research Assistant, INSTAAR, University of Colorado, 1990 to 1994
Professional Research Assistant, INSTAAR, University of Colorado, 1989 to 1990
Physical Scientist, Glaciology Project, U.S.G.S., Washington 1983 to 1989
Danes Research Associates & Geophysical, Tacoma Washington 1979-1983

Field Experience:

Over 14 polar field seasons in Greenland and Antarctica. Extensive field work in equatorial Pacific, Alaska, Ecuador, Cascades and Rocky Mountains.

Service:

Field Leader/Chief Scientist for West Antarctic Ice Sheet (WAIS) Divide Deep Ice Core Project (2 yrs); Current member, Experts Panel on Isotopic Measurements on Trace Gases in the Atmosphere; International Atomic Energy Agency (IAEA). Past member Ice Core Working Group NSF Advisory Committee; Co-chair NSF panel on Science at Summit Greenland; Executive Committee member for Biogeosphere Atmosphere, Stable Isotope Network (BASIN); Member, American Geophysical Union.

Recent Projects:

PI on NSF award # 1833165, Closing the Water Vapor Exchange Budget between the Ice Sheets and Free Atmosphere, (\$298.3K), 7/2018-7/2020.

CoPI on NSF proposal (Pending), Collaborative Research: NNA: Summit Station Core Climate Observatory: The Next Generation of Greenland Science and Scientists, (\$5.6M), 5 years.

Senior personnel on NSF award # 1804098, J.W.C. White PI, Collaborative Research: The Fingerprint of Abrupt Temperature Events Throughout Greenland During the Last Glacial Period. (\$229.2K). 8/2018- 7/2021.

PI on sub-award (\$363.7K) on NSF Sustainability Network award #1240584: Routes to Sustainability for Natural Gas Development and Water and Air Resources in the Rocky Mountain Region. (\$12.3M) 11/2013- 9/2019.

Senior personnel on NSF award # 1043167, J.W.C. White PI, Collaborative research with West Antarctic Ice Sheet Divide Project. Providing two seasons of

deep field management and subsequent laboratory analysis for high resolution stable isotopes on 3,400 m ice core. (\$453.6K), 6/2011-5/2016.

Senior personnel on NSF award # 1443328, J.W.C. White, PI, Collaborative Research: Record of the Triple-oxygen Isotope and Hydrogen Isotope Composition of Ice from an Ice Core at South Pole (\$260K), 6/2015-5/2018.

Senior personnel on NSF award # 1304109, J.W.C. White PI, Collaborative Research: Refining Long-term Climate Records from the Renland Ice Cap. (\$474.9K), 11/2013-10/2017.

Collaborator with NOAA Global Monitoring Division, Earth Systems Research Lab. Providing isotopic analysis of atmospheric trace gases collected bi-weekly from 55 global sites, for over 12,000 samples per year. (~\$5M). On going multi-year contract since 1990.

Patents:

Patent No: US 8,181,544 B2, May 2012; Liquid sample evaporator for vapor analysis, Crosson, E., Richman B.A., Vaughn, B.H. and White, J.W.C.

Refereed Publications: [Vaughn H-Index = 33, i10 Index = 45]

Nisbet, E.G., M.R.Manning, E.J.Dlugokencky, R.E.Fisher, D. Lowry, S.E. Michel, C.LundMyhre, S.M. Platt, G. Allen, P. Bousquet, R.Brownlow, M. Cain, J.L. France, O.Hermansen, R. Hossaini, A.E. Jones, I. Levin, A.C.Manning, G.Myhre, J.A.Pyle, B.Vaughn, N.J.Warwick, J.W.C.White, **2019**, Very strong atmospheric methane growth in the four years 2014 - 2017: Implications for the Paris Agreement. *Global Biogeochemical Cycles*, <https://doi.org/10.1029/2018GB006009>.

Peters, W., Van der Velde, I., Van Schaik, E., Miller, J., Ciais, P., Duarte, H., van der Laan-Luijkx, I., Van der Molen, M., Scholze, M., Schaefer, K., Vidale, P. L., Verhoef, A., Warlind, D., Zhu, D., Tans, P., Vaughn, B. and White, J. **2018**: Increased water-use efficiency and reduced CO₂ uptake by plants during droughts at a continental-scale. *Nature Geoscience*. DOI .org/10.1038/s41561-018-0212-7

Umezawa, T., Brenninkmeijer, C. A. M., Röckmann, T., van der Veen, C., Tyler, S. C., Fujita, R., Morimoto, S., Aoki, S., Sowers, T., Schmitt, J., Bock, M., Beck, J., Fischer, H., Sylvia Englund Michel, Bruce H. Vaughn, Miller, J. B., James W. C. White, Brailsford, G., Schaefer, H., Sperlich, P., Brand, W. A., Rothe, M., Blunier, T., Lowry, D., Fisher, R. E., Nisbet, E. G., Rice, A. L., Bergamaschi, P., Veidt, C., Levin, I. **2018**: Interlaboratory comparison of $\delta^{13}\text{C}$ and δD measurements of atmospheric CH₄ for combined use of data sets from different laboratories. *Atmospheric Measurement Techniques*, 11(2): 1207-1231. DOI: 10.5194/amt-11-1207-2018

van der Velde, I. R., Miller, J. B., van der Vollen, M. K., Tans, P. P., Bruce H. Vaughn, James W. C. White, Schaefer, K., Peters, W. **2018**: The CarbonTracker Data Assimilation System for CO₂ and $\delta^{13}\text{C}$ (CTDAS-C13 v1.0): Retrieving information on land-atmosphere exchange processes. *Geoscientific Model Development*, 11(1): 283-304. DOI: 10.5194/gmd-11-283-2018

- Isaac Vimont, Turnbull, J. C., Petrenko, V. V., Place, P. F., Karion, A., Miles, N. L., Richardson, S. J., Gurney, K., Patarasuk, R., Sweeney, C., Bruce H. Vaughn, James W. C. White **2017**: Carbon monoxide isotopic measurements in Indianapolis constrain urban source isotopic signatures and support mobile fossil fuel emissions as the dominant wintertime CO source. *Elementa: Science of the Anthropocene*, 5: article 63. DOI: 10.1525/elementa.136
- Graven, H., Allison, C.E., Etheridge, D.M., Hammer, S., Keeling, R.F., Levin, I., Meijer, H.A.J., Rubino, M., Tans, P., Trudinger, C.M., Bruce H. Vaughn, James W. C. White **2017**: Compiled records of carbon isotopes in atmospheric CO₂ for historical simulations in CMIP6. *Geosci. Model Dev.*, 10, 4405-4417 DOI: 10.5194/gmd-10-4405-2017
- Koenig, L., Bruce H. Vaughn, Dibb, J. 2017: Envisioning and sustaining science at Summit Station, Greenland. *Eos*, 98, 18 September **2017** DOI: 10.1029/2017EO082095
- Tyler Jones, James W. C. White, Steig, E. J., Bruce H. Vaughn, Valerie Morris, Gkinis, V., Markle, B. R., Schoenemann, S. W. **2017**: Improved methodologies for continuous-flow analysis of stable water isotopes in ice cores. *Atmospheric Measurement Techniques*, 10: 617-632. DOI: 10.5194/amt-10-617-2017
- Schaefer, H., Fletcher, S. E. M., Veidt, C., Lassey, K. R., Brailsford, G. W., Bromley, T. M., Dlugokencky, E. J., Sylvia Englund Michel, Miller, J. B., Levin, I., Lowe, D. C., Martin, R. J., Bruce H. Vaughn, James W. C. White, **2016**: A 21st-century shift from fossil-fuel to biogenic methane emissions indicated by ¹³CH₄. *Science*, 352(6281): 80-84. DOI: 10.1126/science.aad2705
- Nisbet, E. G., Dlugokencky, E. J., Manning, M. R., Lowry, D., Fisher, R. E., France, J. L., Sylvia Englund Michel, Miller, J. B., James W. C. White, Bruce H. Vaughn, Bousquet, P., Pyle, J. A., Warwick, N. J., Cain, M., Brownlow, R., Zazzeri, G., Lanoisellé, Manning, A. C., Gloor, E., Worthy, D. E. J., Brunke, E.-G., Labuschagne, C., Wolff, E. W., Ganesan, A. L., **2016**: Rising atmospheric methane: 2007-2014 growth and isotopic shift. *Global Biogeochemical Cycles*, 30(9): 1356-1370. DOI: 10.1002/2016GB005406
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- Warwick, N. J., Cain, M. L., Fisher, R., France, J. L., Lowry, D., Sylvia Englund Michel, Nisbet, E. G., Bruce H. Vaughn, James W. C. White, Pyle, J. A., **2016**: Using $\delta^{13}\text{C}-\text{CH}_4$ and $\delta\text{D}-\text{CH}_4$ to constrain Arctic methane emissions. *Atmospheric Chemistry and Physics*, 16: 14,891-14,908. DOI: 10.5194/acp-16-14891-2016
- WAIS-Divide Project members (Buizer, C. Lead author). **2015**: Precise interhemispheric phasing of the bipolar seesaw during abrupt Dansgaard-Oeschger events. *Nature* volume 520, pages 661–665. <http://dx.doi.org/10.1038/nature14401>.
- Ghosh, A., Patra, P. K., Ishijima, K., Umezawa, T., Ito, A., Etheridge, D. M., Sugawara, S., Kawamura, K., Miller, J. B., Dlugokencky, E. J., Krummel, P. B., P. J. Fraser, L. P. Steele, R. L. Langenfelds, James W. C. White, Bruce H. Vaughn, T. Saeki, S.

- Aoki, T. Nakazawa, **2015**: Variations in global methane sources and sinks during 1910–2010. *Atmospheric Chemistry and Physics*, 15, 2595-2612. DOI: 10.5194/acp-15-2595-2015
- Liu, L., Zhou, L., Bruce H. Vaughn, Miller, J. B., Brand, W. A., Rothe, M., Xia, L., **2014**: Background variations of atmospheric CO₂ and carbon-stable isotopes at Waliguan and Shangdianzi stations in China. *Journal of Geophysical Research—Atmospheres*, 119(9): 5602-5612. DOI: 10.1002/2013JD019605
- Souney, J. M., Twickler, M. S., Hargreaves, G. J., Bencivengo, B. M., Kippenhan, M. J., Johnson, J. A., Cravens, E. D., Neff, P. D., Nunn, R. M., Orsi, A. J., Popp, T. J., Rhoades, J. F., Bruce H. Vaughn, Voigt, D. E., Wong, G. J., Taylor, K. C., **2014**: Core handling and processing for the WAIS Divide ice-core project. *Annals of Glaciology*, 55(68): 15-26. DOI: 10.3189/2014AoG68A008
- Bowling, D. R., Ballantyne, A. P., Miller, J. B., Burns, S. P., Conway, T. J., Menzer, O., Stephens, B. B., Bruce H. Vaughn, **2014**: Ecological processes dominate the ¹³C land disequilibrium in a Rocky Mountain subalpine forest. *Global Biogeochemical Cycles*, 28(4): 352-370. DOI: 10.1002/2013GB004686
- Ghosh, A., Patra, P. K., Ishijima, K., Umezawa, T., Ito, A., Etheridge, D. M., Sugawara, S., Kawamura, K., Miller, J. B., Dlugokencky, E. J., Krummel, P. B., P. J. Fraser, L. P. Steele, R. L. Langenfelds, James W. C. White, Bruce H. Vaughn, T. Saeki, S. Aoki, T. Nakazawa, **2014**: Variations in global methane sources and sinks during 1910–2010. *Atmospheric Chemistry and Physics Discussions*, 14: 27619-27661. DOI: 10.5194/acpd-14-27619-2014
- WAIS Divide Project members, including, James W. C. White, Gary Clow, Bruce H. Vaughn, **2013**: Onset of deglacial warming in West Antarctica driven by local orbital forcing. *Nature*, 500: 440-444. DOI: 10.1038/nature12376
- NEEM Community Authors: D. Dahl-Jensen, M. R. Albert, A. Aldahan, N. Azuma, D. Balslev-Clausen, M. Baumgartner, James W. C. White, Bruce H. Vaughn, and others. **2013**: Eemian interglacial reconstructed from a Greenland folded ice core. *Nature*, vol. 493, pp. 489-494, 2013 DOI: doi:10.1038/nature11789
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- WAIS Divide Project members, including, James W. C. White, Gary Clow, Bruce H. Vaughn, **2013**: Onset of deglacial warming in West Antarctica driven by local orbital forcing. *Nature*, 500: 440-444. DOI: 10.1038/nature12376
- Levin, I., Veidt, C., Vaughn, B.H., Brailsford, G., Bromley, T., Heinz, R., Lowe, D., Miller, J. B., Poss, C., James W. C. White, **2012**: No inter-hemispheric delta(CH₄)-C-13 trend observed. *Nature*, 486(7404): E3-E4. DOI: 10.1038/nature11175
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- Gooseff, M.N., McKnight, ., D.M. .and Vaughn, B.H. **2003**. Determining long timescale hyporheic zone flow paths in Antarctic streams. *Hydrol. Process.* _17, 1691-1710.
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