

Philip E. Higuera

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PROFESSIONAL PREPARATION

- Ph.D. 2006 University of Washington, Seattle, Division of Ecosystem Science, College of Forest Resources. Advisor: Dr. Linda Brubaker. Committee members: Drs. James Agee, Patricia Anderson, Daniel Gavin, Douglas Sprugel
- M.S. 2002 University of Washington, Seattle, Division of Ecosystem Science, College of Forest Resources. Advisors: Dr. Linda Brubaker and Dr. Douglas Sprugel
- B.A. 1998 Middlebury College, Middlebury, VT: *magna cum laude*; High Honors, Biology, High Honors, Environmental Studies-Geology. Thesis advisors: Drs. Andrea Lloyd and Grant Meyer

PROFESSIONAL EXPERIENCE

- 2021 – *Professor, Department of Ecosystem and Conservation Sciences, W.A. Franke College of Forestry and Conservation, University of Montana*
- 2021-2022 *Visiting sabbatical fellow, Earth Lab, Cooperative Institute for Research In Environmental Sciences, University of Colorado, Boulder (Oct. – Feb.)*
- 2015-2021 *Associate Professor, Department of Ecosystem and Conservation Sciences, W.A. Franke College of Forestry and Conservation, University of Montana*
- 2009-2015 *Assistant Professor, Department of Forest, Rangeland, and Fire Sciences, College of Natural Resources, University of Idaho (tenure & promotion awarded April 2015)*
- 2008-2009 *Adjunct Instructor, Department of Earth Science, Montana State University*
- 2006-2009 *National Park Ecological Research Fellow, Whitlock Paleoecology Lab, Montana State University*
- 2006-2009 *Postdoctoral Research Scientist, Hu Quaternary Paleoecology Lab, University of Illinois*

REFEREED MANUSCRIPTS (**AVAILABLE ON LAB WEBPAGE**)

Graduate or undergraduate student advised directly # or indirectly *; post-doc @

Summary: Thompson Reuters Research ID: <http://www.researcherid.com/rid/B-1330-2010>

ISI-Web of Knowledge: h-index = 47; total citations > 10,000.

Google Scholar: h-index = 56, i10-index = 89, total citations > 16,000

87. Pourmohamad, Y., J.T. Abatzoglou, E.J. Belval, E. Fleishman, K. Short, M.C. Reeves, N. Nauslar, **P.E. Higuera**, E. Henderson, S. Ball, A. AghaKouchak, J.P. Prestemon, J. Olszewski, and M. Sadegh. 2024. Physical, social, and biological attributes for improved understanding and prediction of wildfires: FPA FOD-Attributes dataset. *Earth System Science Data*. 16: 3045-3060.

86. #Vieira, S.T., K.T. Davis, Z. Holden, A.J. Larson, and **P.E. Higuera**. 2024. Western larch regeneration more sensitive to wildfire-related factors than seasonal climate variability. *Forest Ecology and Management*. 565: 122001.
85. *Kreider, M.R., **P.E. Higuera**, Parks, S.A., Rice, W.L., White, N., and A.J. Larson. 2024. Fire suppression makes wildfires more severe and accentuates impacts of climate change and fuel accumulation. *Nature Communications*. 15: 2412.
84. #Clark-Wolf, K.D., **P.E. Higuera**, K.K. McLauchlan, B.N. Shuman, and M.C. Parish. 2023. Fire-regime variability and ecosystem resilience over four millennia in a Rocky Mountain subalpine watershed. *Journal of Ecology*. 111: 2549-2780 doi.org/10.1111/1365-2745.14201. *Featured on [JoE's blog](#).
83. #Clark-Wolf, K.D., **P.E. Higuera**, B.N. Shuman, and K.K. McLauchlan. 2023. Wildfire activity in northern Rocky Mountain subalpine forests still within millennial-scale range of variability. *Environmental Research Letters*. 18: 094029. doi.org/10.1088/1748-9326/acee16
82. Modaresi Rad, Arash, J.T. Abatzoglou, E. Fleishman, M.H. Mockrin, V.C. Radeloff, Y. Pourmohamad, M. Cattau, J.M. Johnson, **P.E. Higuera**, and Mojtaba Sadegh. Social Vulnerability of the People Exposed to Wildfires in U.S. West Coast States. *Science Advances* 9, 38: <https://doi.org/10.1126/sciadv.adh4615>
81. @Peeler, J.L., L. McCauley, K.L. Metlen, T. Woolley, K.T. Davis, M.D. Robles, R.D. Haugo, R.K. Riley, **P.E. Higuera**, J.E. Fargione, R.N. Addington, S. Bassett, K. Blankenship, M.J. Case, T.B. Chapman, E. Smith, R. Swaty, and N. Welch. Identifying Opportunity Hot Spots for Reducing the Risk of Wildfire-Caused Carbon Loss in Western US Conifer Forests. *Environmental Research Letters* 18: 094040. doi.org/10.1088/1748-9326/acf05a.
80. Jaffe, M.R., M.R. Kreider, D.L.R. Affleck, **P.E. Higuera**, C.A. Seielstad, S.A. Parks, and A. J. Larson. 2023. Mesic mixed-conifer forests are resilient to both historical high-severity fire and contemporary reburns in the US Northern Rocky Mountains. *Forest Ecology and Management*, 545:121283. doi: 10.1016/j.foreco.2023.121283
79. Davis, K.T., M.D. Robles, K.B. Kemp, **P.E. Higuera**, and 59 others. 2023. Reduced fire severity offers near-term buffer to climate-driven declines in conifer resilience across the western United States. *Proceedings of the National Academy of Sciences*, 120: e2208120120. doi: 10.1073/pnas.2208120120
78. **Higuera, P.E.**, M.C. Cook, J.K. Balch, E.N. Stavros, A.L. Mahood, and L.A. St. Denis. Shifting social-ecological fire regimes explain increasing structure loss from Western wildfires. *PNAS Nexus*. doi.org/10.1093/pnasnexus/pgad005
77. #Clark-Wolf, K., **P.E. Higuera**, and K. T. Davis. 2022. Conifer seedling demography reveals mechanisms of initial forest resilience to wildfires in the northern Rocky Mountains. *Forest Ecology and Management* doi.org/10.1016/j.foreco.2022.120487
76. Shuman, J.K., J.K. Balch, R.T. Barnes, **P.E. Higuera**, C.I. Roos, D.W. Schwilk, E.N. Stavros, and 80 others. Reimagine fire science for the Anthropocene. *PNAS Nexus* 1, doi: 10.1093/pnasnexus/pgac115
75. Parish, M., #Wolf, K.D., **Higuera, P.E.**, and Shuman, B.N. 2022. Holocene water levels of Silver Lake, Montana, and the hydroclimate history of the Inland Northwest. *Quaternary Research*, 110: 54-66. doi:10.1017/qua.2022.17
74. Rank, R., M. Maneta, **P.E. Higuera**, Z. Holden, and S. Dobrowski. 2022. Conifer Seedling Survival in Response to High Surface Temperature Events of Varying Intensity and Duration. *Frontiers in Forests and Global Change* 4.

73. **Higuera, P.E.**, B.N. Shuman, and #K.D. Wolf. 2021. Rocky Mountain subalpine forests now burning more than any time in recent millennia. *Proceedings of the National Academy of Sciences*. 118: e2103135118.
72. #Wolf, K.D., **P.E. Higuera**, K.T. Davis, and S.Z. Dobrowski. 2021. Wildfire impacts on forest microclimate vary with biophysical context. *Ecosphere*. 12: e03467.
71. Davis, K.T., **P.E. Higuera**, S. Dobrowski, S.A. Parks, J.T. Abatzoglou, M. Rother, and T.T. Veblen. 2020. Fire-catalyzed vegetation shifts in ponderosa pine and Douglas-fir forests of the western United States. *Environmental Research Letters*. 15: 1040b8.
70. *Chileen, B.V., K.K. McLauchlan, **P.E. Higuera**, M. Parish, and B.N. Shuman. 2020. Vegetation response to wildfire and climate forcing in a Rocky Mountain lodgepole pine forest over the past 2500 years. *The Holocene* 30: 1493-1503.
69. Coop, J.D., S.A. Parks, C.S. Stevens-Rumann, S. Crausbay, **P.E. Higuera**, M.D. Hurteau, A. Tepley, E. Whitman, T. Assal, B.M. Collins, K.T. Davis, S.Z. Dobrowski, D.A. Falk, P.J. Fornwalt, P.Z. Fulé, B.J. Harvey, V.R. Kane, C.E. Littlefield, E.Q. Margolis, M.P. North, M.A. Parisien, S.J. Prichard, and K.C. Rodman. 2020. Wildfire-driven forest conversion in western North American landscapes. *BioScience*. 70: 659-673.
68. McLauchlan, K.K., **P.E. Higuera**, J. Miesel, B.M. Rogers, J. Schweitzer, J.K. Shuman, A.J. Tepley, J.M. Varner, T.T. Veblen, S.A. Adalsteinsson, J.K. Balch, P. Baker, E. Batllori, E. Bigio, P. Brando, M. Cattau, M.L. Chipman, J. Coen, R. Crandall, L. Daniels, N. Enright, W.S. Gross, B.J. Harvey, J.A. Hatten, S. Hermann, R.E. Hewitt, L.N. Kobziar, J.B. Landesmann, M.M. Loranty, S.Y. Maezumi, L. Mearns, M. Moritz, J.A. Myers, J.G. Pausas, A.F.A. Pellegrini, W.J. Platt, J. Roozeboom, H. Safford, F. Santos, R.M. Scheller, R.L. Sherriff, K.G. Smith, M.D. Smith, and A.C. Watts. 2020. Fire as a fundamental ecological process: Research advances and frontiers. *Journal of Ecology* 108:2047-2069 *Featured on [JoE's blog](#). *Highly cited paper
67. #Hoecker, T.J., **P.E. Higuera**, R. Kelly, and F.S. Hu. 2020. Arctic and boreal paleofire records reveal drivers of fire activity and departures from Holocene variability. *Ecology* 101: e03096
66. Pompeani, D.P., K.K. McLauchlan, B.V. Chileen, W.J. Calder, B.N. Shuman, and **P.E. Higuera**. 2020. The biogeochemical consequences of late Holocene wildfires in three subalpine lakes from northern Colorado. *Quaternary Science Reviews* 236: 106293.
65. *Bartowitz, K.J., **P.E. Higuera**, B.N. Shuman, K.K. McLauchlan, and T.W. Hudiburg. 2019. Post-Fire Carbon Dynamics in Subalpine Forests of the Rocky Mountains. *Fire* 2:58.
64. McWethy, D.B., T. Schoennagel, **P.E. Higuera**, M.A. Krawchuk, B.J. Harvey, E.C. Metcalf, C.A. Schultz, C. Miller, A.L. Metcalf, B. Buma, A. Virapongse, J.C. Kulig, R.C. Stedman, Z. Ratajczak, C.R. Nelson, and C.A. Kolden. 2019. Rethinking Resilience to Wildfire. *Nature Sustainability* doi: 10.1038/s41893-019-0353-8
62. Hessburg, P.F., C.L. Miller, S.A. Parks, N.A. Povak, A.H. Taylor, **P.E. Higuera**, S.J. Prichard, M.P. North, B.M. Collins, M.D. Hurteau, A.J. Larson, C.D. Allen, S.L. Stephens, H. Rivera-Huerta, C.S. Stevens-Rumann, L.D. Daniels, Z.E. Gedalof, R.W. Gray, V.R. Kane, D.J. Churchill, R.K. Hagmann, T.A. Spies, C.A. Cansler, R.T. Belote, T.T. Veblen, M.A. Battaglia, C. Hoffman, C.N. Skinner, H.D. Safford, and R.B. Salter. 2019. Climate, Environment, and Disturbance History Govern Resilience of Western North American Forests. *Frontiers in Ecology and Evolution* 7:239. doi: 10.3389/fevo.2019.00239

61. **Higuera, P.E.**, A.L. Metcalf, C. Miller, B. Buma, D.B. McWethy, E. C. Metcalf, Z. Ratajczak, C.R. Nelson, B.C. Chaffin, R.C. Stedman, S. McCaffrey, T. Schoennagel, B.J. Harvey, S.M. Hood, C.A. Schultz, A.E. Black, D. Campbell, J.H. Haggerty, R.E. Keane, M.A. Krawchuk, J.C. Kulig, R. Rafferty, and A. Virapongse. 2019. Integrating subjective and objective dimensions of resilience in fire-prone landscapes. *BioScience* 69: 379-388. **Editor's Choice*
60. #Hankin, L.E., **P.E. Higuera**, @K.T. Davis, and S.Z. Dobrowski. 2019. Impacts of growing-season climate on tree growth and post-fire regeneration in ponderosa pine and Douglas-fir forests. *Ecosphere* 10(4):e02679
59. @Davis, K.T., S.Z. Dobrowski, **P.E. Higuera**, Z.A. Holden, T.T. Veblen, M.T. Rother, S.A. Parks, A. Sala, and M.P. Maneta. 2019. Wildfires and climate change push low-elevation forests across a critical climate threshold for tree regeneration. *Proceedings of the National Academy of Sciences* 116: 6193-6198.
58. #Young, A.M., **P.E. Higuera**, J.T. Abatzoglou, P.A. Duffy, and F.S. Hu. 2019. Consequences of climatic thresholds for projecting fire activity and ecological change. *Global Ecology & Biogeography* 28: 521-532.
57. #Hoecker, T.J., and **P.E. Higuera**. 2019. Forest succession and climate variability interacted to control fire activity over the last four centuries in an Alaskan boreal landscape. *Landscape Ecology* 34: 227-241.
56. #Kemp, K.B., **P.E. Higuera**, P. Morgan, and J.T. Abatzoglou. 2019. Climate will increasingly determine post-fire tree regeneration success in low-elevation forests, Northern Rockies, USA. *Ecosphere* 10: e02568. doi: 10.1002/ecs2.2568
55. @Davis, K.T., S.Z. Dobrowski, Z.A. Holden, **P.E. Higuera**, and J.T. Abatzoglou. 2019. Microclimatic buffering in forests of the future: The role of local water balance. *Ecography* 41:1-11. **Editor's choice*
54. Keane, R.E., R.A. Loehman, L.M. Holsinger, D.A. Falk, **P.E. Higuera**, S.M. Hood, and P.F. Hessburg. 2018. Use of landscape simulation modeling to quantify resilience for ecological applications. *Ecosphere* 9:e02414.
53. Hörnberg, G., T. Josefsson, T.H. DeLuca, **P.E. Higuera**, L. Liedgren, L. Östlund, and I. Bergman. 2018. Anthropogenic use of fire led to degraded scots pine-lichen forest in northern Sweden. *Anthropocene* 24:14-29.
52. #Hankin, L.E., **P.E. Higuera**, K.T. Davis, and S.Z. Dobrowski. 2018. Accuracy of node and bud-scar counts for aging two dominant conifers in western North America. *Forest Ecology and Management* 427:365-371.
51. @Davis, K.T., **P.E. Higuera**, A. Sala. 2018. Anticipating fire-mediated impacts of climate change using a demographic framework. *Functional Ecology*. 32: 1729-1745.
50. Morris, J.L., S. Cottrell, C.J. Fettig, R.J. DeRose, K.M. Mattor, V.A. Carter, J. Clear, J. Clement, W.D. Hansen, J.A. Hicke, **P.E. Higuera**, A.W.R. Seddon, H. Seppä, R.L. Sherriff, J.D. Stednick, and S.J. Seybold. 2018. Bark beetles as agents of change in social-ecological systems. *Frontiers in Ecology and the Environment*. 16: S34-S43.
49. Stevens-Rumann, C.S., Kemp, K.B., **Higuera, P.E.**, Harvey, B.J., Rother, M.T., Donato, D.C., Morgan, P. & Veblen, T.T. 2018. Evidence for declining forest resilience to wildfires under climate change. *Ecology Letters*. 21: 243-252.
48. Hudiburg, T.W., **P.E. Higuera**, and J.A. Hicke. 2017. Fire-regime variability impacts forest carbon dynamics for centuries to millennia. *Biogeosciences*. 14: 3873-3882.

47. McLauchlan, K.K., L.M. Gerhart, J.J. Battles, J.M. Craine, A.J. Elmore, **P.E. Higuera**, M.C. Mack, M.C., B.E. McNeil, D.M. Nelson, N. Pederson, S.S. Perakis. 2017. Centennial-scale reductions in nitrogen availability in temperate forests of the United States. *Scientific Reports*. 7: 7856. doi:10.1038/s41598-017-08170-z
46. Itter, M.S., A.O. Finley, M.B. Hooten, **P.E. Higuera**, J.R. Marlon, R. Kelly, and J.S. McLachlan. 2017. A model-based approach to wildland fire reconstruction using sediment charcoal records. *Environmetrics*. 28: e2450.
45. Crausbay, S.D., **P.E. Higuera**, D.G. Sprugel, and L.B. Brubaker. 2017. Fire catalyzed rapid ecological change in lowland coniferous forests of the Pacific Northwest over the past 14,000 years. *Ecology*. 98: 2356-2369
44. @Morris, J.L., **P.E. Higuera**, S. Haberle, and C. Whitlock. 2017. Modern pollen from small hollows reflects *Athrotaxis cupressoides* density across a wildfire gradient in subalpine forests of the Central Plateau, Tasmania, Australia. *The Holocene*. 27: 1781-1788.
43. @Morris, J.L., S. Cottrell, C.J. Fettig, W.D. Hansen, R.L. Sherriff, V.A. Carter, J.L. Clear, J. Clement, R.J. DeRose, J.A. Hicke, **P.E. Higuera**, K.M. Mattor, A.W.R. Seddon, H.T. Seppä, J.D. Stednick, S.J. Seybold. 2017. Managing bark beetle impacts on ecosystems and society: priority questions to motivate future research. *Journal of Applied Ecology*. 54: 750-760.
42. #Young, A.M., **Higuera, P.E.**, Duffy, P.A., and F.S. Hu. 2017. Climatic thresholds shape northern high-latitude fire regimes and imply vulnerability to future climate change. *Ecography*. 40: 606-617.
41. Leys, B., **P.E. Higuera**, K.K. McLauchlan, and P.V. Dunnette#. 2016. Wildfires and geochemical change in a subalpine forest over the past six millennia. *Environmental Research Letters*. 11: 125003.
40. Johnstone, J.F., C.D. Allen, J.F. Franklin, L.E. Frelich, B.J. Harvey, **P.E. Higuera**, M.C. Mack, R.K. Meentemeyer, M.R. Metz, G.L.W. Perry, T. Schoennagel, and M.G. Turner. 2016. Changing disturbance regimes, ecological memory, and forest resilience. *Frontiers in Ecology and the Environment*. 7: 369-378. *Highly cited paper
39. Marlon, J.R., R. Kelly, A.L. Daniau, B. Vanni re, M.J. Power, P. Bartlein, **P.E. Higuera**, O. Blarquez, S. Brewer, and T. Br ucher. 2016. Reconstructions of biomass burning from sediment-charcoal records to improve data-model comparisons. *Biogeosciences* 13:3225-3244.
38. Kranabetter, J.M., K.K. McLauchlan, S.K. Enders, J.M. Fraterrigo, **P.E. Higuera**, J.L. Morris, E.B. Rastetter, R. Barnes, B. Buma, D.G. Gavin, L.M. Gerhart, L. Gillson, P. Hietz, M.C. Mack, B. McNeil, and S. Perakis. 2016. Temporal scaling of biogeochemical response to ecosystem disturbance. *Ecosystems*. 19: 387-395.
37. Abbot, B.W., J.B. Jones, E.A.G. Schuur, F.S. Chapin III, and 96 others including **P.E. Higuera**. 2016. Biomass offsets little or none of permafrost carbon release from soils, streams, and wildfire: an expert assessment. *Environmental Research Letters*. 11: 034014
36. Tinkham, W.T., A.M.S. Smith, **P.E. Higuera**, J.A. Hatten, N.W. Brewer, and S.H. Doerr. 2016. Replacing time with space: using laboratory fire to explore the effects of repeated burning on black carbon degradation. *International Journal of Wildland Fire*. 25: 242-248.
35. Smith, A. M. S., C. A. Kolden, T. B. Paveglio, M. A. Cochrane, D. M. J. S. Bowman, M. A. Moritz, A. D. Kliskey, L. Alessa, A. T. Hudak, C. M. Hoffman, J. A. Lutz, L. P. Queen, S. J. Goetz, **P. E. Higuera**, L. Boschetti, M. Flannigan, K. M. Yedinak, A. C. Watts, E. K. Strand, J. W. van Wagtenonk, J. W. Anderson, B. J. Stocks, and J. T. Abatzoglou.

2016. The Science of Firescapes: Achieving Fire-Resilient Communities. *BioScience*, 66:130-146.
34. #Kemp, K.B., **P.E. Higuera**, and P. Morgan. 2016. Fire legacies impact conifer regeneration across environmental gradients in the U.S. northern Rockies. *Landscape Ecology*, 31: 619-636.
33. Hu, F.S., **P.E. Higuera**, P.A. Duffy, M.L. Chipman, A.V. Rocha, #A.M. Young, R. Kelly, and M.C. Dietze. 2015. Tundra fires in the Arctic: Natural variability and responses to climate change. *Frontiers in Ecology and the Environment*, 13: 369-377.
32. **Higuera, P.E.**, J.T. Abatzoglou, J.S. Littell, and P. Morgan. 2015. The changing strength and nature of fire-climate relationships in the northern Rocky Mountains, U.S.A., 1902-2008. *PLoS ONE*, 10:e0127563.
31. @Morris, J.L., K.K. McLauchlan, and **P.E. Higuera**. 2015. Sensitivity and complacency of sedimentary biogeochemical records to climate-mediated forest disturbances. *Earth-Science Reviews*, 148:121-133.
30. Klos, P.Z., J. Abatzoglou, A. Bean, J. Blades, M.A. Clark, M. Dodd, T.E. Hall, A. Haruch, **P.E. Higuera**, J.D. Holbrook, V.S. Jansen, #K. Kemp, A. Lankford, T.E. Link, T. Magney, A.J.H. Meddens, L. Mitchell, B. Moore, P. Morgan, B.A. Newingham, R.J. Niemeyer, B. Soderquist, A.A. Suazo, K.T. Vierling, V. Walden, and C. Walsh. 2015. Indicators of climate change in Idaho: An assessment framework for coupling biophysical change and social perception. *Weather, Climate, and Society*, 7, 238-254.
29. Chipman, M.L., V. Hudspeth, **P.E. Higuera**, P.A. Duffy, R.F. Kelly, W.W. Oswald, and F.S. Hu. 2015. Spatiotemporal patterns of tundra fires: Late-Quaternary records from Alaska. *Biogeosciences*, 12: 4017-4027.
28. **Higuera, P.E.**, C.E. Briles, and C. Whitlock. 2014. Fire-regime complacency and sensitivity to centennial- through millennial-scale climate change in Rocky Mountain subalpine forests, Colorado, U.S.A. 2014. *Journal of Ecology*, 102: 1429-1441.
27. #Dunnette P.V., **P.E. Higuera**, K.K. McLauchlan, K.M. Derr, @C.E. Briles, M.H. Keefe. 2014. Biogeochemical impacts of wildfires over four millennia in a Rocky Mountain subalpine watershed. *New Phytologist*, 203: 900-912.
26. McLauchlan, K., **P.E. Higuera**, D.G. Gavin, S. S. Perakis, M.C. Mack, H. Alexander, J. Battles, F. Biondi, B. Buma, D. Colombaroli, S. Enders, D.R. Engstrom, F.S. Hu, J.R. Marlon, J.D. Marshal, M. McGlone, J.L. Morris, L.E. Nave, B.N. Shuman, E.A.H. Smithwick, D.H. Urrego, D.A. Wardel, C.J. Williams, and J.J. Williams. 2014. Reconstructing disturbances and their biogeochemical consequences over multiple timescales. *BioScience*. 64: 105-116.
25. *Kelly, R. F., *M.L. Chipman, **P.E. Higuera**, V. Stefanova, L.B. Brubaker, and F.S. Hu. 2013. Recent burning of boreal forests exceeds variability of the past 10,000 years. *Proceedings of the National Academy of Sciences*, 110: 13055-13060.
24. McWethy, D.B., **P.E. Higuera**, C. Whitlock, T.T. Veblen, D.M.J.S. Bowman, G. Cary, S.G. Haberle, R.E. Kean, B.D. Maxwell, M.S. McGlone, G.L.W. Perry, J.M. Wilmshurst, A. Holz, and A. Tepley. 2013. A conceptual framework for predicting temperate ecosystem sensitivity to human impacts on fire regimes. *Global Ecology & Biogeography*, 22: 900-912.
23. *Brewer, N.W., A.M.S. Smith, J.A. Hatten, **P.E. Higuera**, A.T. Hudak, R.D. Ottmar, and W.T. Tinkham. 2013. Fuel Moisture Influences on Fire-altered Carbon in Masticated Fuels: An Experimental Study. *Journal of Geophysical Research-Biogeosciences*, 118, 30-40.

22. *Barrett, C.M., Kelly, R.F., **Higuera, P.E.**, and F.S. Hu. 2013. Climatic and land-cover influences on the spatiotemporal dynamics of Holocene boreal fire regimes. *Ecology*, 92: 389-402.
21. Rocha, A.V., M.M. Loranty, **P.E. Higuera**, M.C. Mack, F.S. Hu, B.M. Jones, A.L. Breen, E.B. Rastetter, S.J. Goetz, and G.R. Shaver. 2012. The footprint of Alaskan tundra fires during the past half-century: implications for surface properties and radiative forcing. *Environmental Research Letters*, 7: 044039, doi:10.1088/1748-9326/7/4/044039.
20. **Higuera, P.E.**, *Chipman, M.L., Barnes, J.L., Urban, M.A., Hu, F.S. 2011a. Variability of tundra fire regimes in Arctic Alaska: millennial scale patterns and ecological implications. *Ecological Applications*, 21: 3211-3226.
19. **Higuera, P.E.**, C. Whitlock, and #J. Gage. 2011b. Fire history and climate-vegetation-fire linkages in subalpine forests of Yellowstone National Park, Wyoming, U.S.A., AD 1240-1975. *The Holocene*, 21:327-341.
18. *Kelly, R.F., **P.E. Higuera**, *C.M. Barrett, and F.S. Hu. 2011. A signal-to-noise index to quantify the potential for peak detection in sediment-charcoal records. *Quaternary Research*, 75: 11-17.
17. Hu, F.S., **P.E. Higuera**, J.E. Walsh, W.L. Chapman, P.A. Duffy, L.B. Brubaker, and M.L. Chipman. 2010. Tundra burning in Alaska: linkages to climatic change and sea-ice retreat. *Journal of Geophysical Research – Biogeosciences*, 115, G04002 doi:10.1028/2009JG001270.
16. **Higuera, P.E.**, Gavin, D.G., Bartlein, P.J. and Hallett, D.J. 2010. Peak detection in sediment-charcoal records: impacts of alternative data analysis methods on fire-history interpretations. *International Journal of Wildland Fire*, 19: 996-1014.
15. Whitlock, C., **P.E. Higuera**, D. McWethy, and C.E. Briles. 2010. Paleoecological perspectives on fire ecology: revisiting the fire regime concept. 2010. *The Open Ecology Journal*, 3: 6-23.
14. Ali, A.A., **P.E. Higuera**, Y. Bergeron, and C. Carcaillet. 2009. Comparing fire-history interpretations based on area, number and estimated volume of macroscopic charcoal in lake sediments. *Quaternary Research* 72: 462-486.
13. Marlon, J.R., P.J. Bartlein, M.K. Walsh, S.P. Harrison, K.J. Brown, M.E. Edwards, **P.E. Higuera**, M.J. Power, C. Whitlock, R.S. Anderson, C. Briles, A. Brunelle, C. Carcaillet, M. Daniels, F.S. Hu, M. Lavoie, C. Long, T. Minckley, P.J.H. Richard, S.L. Shafer, W. Tinner, and C. Umbanhowar. 2009. Wildfire responses to abrupt climate change in North America. *Proceedings of the National Academy of Sciences* 106: 2519-2524.
12. Brubaker, L.B., **P.E. Higuera**, T.S. Rupp, M. Olson, P.M. Anderson, and F.S. Hu. 2009. Linking sediment charcoal records and ecological modeling to understand causes of past fire-regime change in boreal forests. *Ecology* 90: 1788-1801.
11. **Higuera, P.E.**, L.B. Brubaker, P.M. Anderson, F.S. Hu, and T.A. Brown. 2009. Vegetation mediated the impacts of postglacial climate change on fire regimes in the south-central Brooks Range, Alaska. *Ecological Monographs* 79: 201-219.
10. Marlon, J.R., P.J. Bartlein, C. Carcaillet, D.G. Gavin, S.P. Harrison, **P.E. Higuera**, F. Joos, M.J. Power, and I.C. Prentice. 2008. Climate and human influences on global biomass burning over the past two millennia. *Nature Geoscience* 1: 697-702.
9. Briles, C.E., C. Whitlock, P.J. Bartlein, and **P.E. Higuera**. 2008. Regional and local controls on postglacial vegetation and fire in the Siskiyou Mountains, northern California, USA. *Palaeogeography Palaeoclimatology Palaeoecology* 265: 159-169.

8. **Higuera, P.E.**, L.B. Brubaker, P.M. Anderson, T.A. Brown, A.T. Kennedy, and F.S. Hu. 2008. Frequent Fires in Ancient Shrub Tundra: Implications of Paleorecords for Arctic Environmental Change. *PLoS ONE* 3:e0001744.
7. Sugimura, W., D.G. Sprugel, L.B. Brubaker, and **P.E. Higuera**. 2008. Millennial-scale changes in local vegetation and fire regimes on Mt. Constitution, Orcas Island, Washington, USA, using small hollow sediments. *Canadian Journal of Forest Research* 38: 566-575.
6. Power, M.J., and 84 others including **P.E. Higuera**. 2008. Changes in fire regimes since the Last Glacial Maximum: an assessment based on a global synthesis and analysis of charcoal data. *Climate Dynamics* 30: 887-907.
5. **Higuera, P.E.**, M.E. Peters, L.B. Brubaker, and D.G. Gavin. 2007. Understanding the origin and analysis of sediment-charcoal records with a simulation model. *Quaternary Science Reviews* 26:1790-1809.
4. Peters, M.E., and **P.E. Higuera**. 2007. Quantifying the source area of macroscopic charcoal with a particle dispersal model *Quaternary Research* 67:304-310.
3. Hu, F.S., L.B. Brubaker, D.G. Gavin, **P.E. Higuera**, J.A. Lynch, T.S. Rupp, and W. Tinner. 2006. How climate and vegetation influence the fire regime of the Alaskan Boreal Biome: the Holocene perspective. *Mitigation and Adaptation Strategies for Global Change* 11:829-846.
2. **Higuera, P.E.**, D.G. Sprugel, and L.B. Brubaker. 2005. Reconstructing fire regimes with charcoal from small-hollow sediments: a calibration with tree-ring records of fire. *The Holocene* 15:238-251.
1. Trombulak, S.C., **P.E. Higuera**, and M. DesMeules. 2001. Population trends of wintering bats in Vermont. *Northeastern Naturalist* 8:51-62.

NON-REFEREED PUBLICATIONS

19. Clark-Wolf, K.D. and **Higuera, P.E.** [What 2,500 years of wildfire evidence and the extreme fire seasons of 1910 and 2020 tell us about the future of fire in the West.](#) *The Conversation*. October 17, 2023. *Invited public-facing summary
18. Davis, K.T., Peeler, J., and **Higuera, P.E.** [The West's iconic forests are increasingly struggling to recover from wildfires – altering how fires burn could boost their chances.](#) *The Conversation*. March 6, 2023. *Invited public-facing summary
17. **Higuera, P.E.**, Cook, M.C., Balch, J.K., Stavros, E.N. 2023. [Western wildfires destroyed 246% more homes and buildings over the past decade – fire scientists explain what's changing.](#) *The Conversation*. Feb. 1, 2023. *Invited public-facing summary
16. #Wolf, K.D., K.T. Davis, and **P.E. Higuera**. 2022. [Wildfire effects on microclimate conditions and tree regeneration in mixed conifer forests.](#) *Northern Rockies Fire Science Network Research Brief* 15:3.
15. **Higuera, P.E.**, Crausbay, S., Shuman, B.N., #Wolf, K.D. 2022. [Challenges to Forest Restoration in an Era of Unprecedented Climate and Wildfire Activity in Rocky Mountain Subalpine Forests.](#) *Past Global Changes Magazine*, 30: 30-31. *Invited contribution
14. Miller, C., **Higuera, P.E.**, McWethy, D.B., Metcalf, A.L., Metcalf, E.C., Black, A.E.; Clarke, L., Hodge, H. 2021. [Developing strategies to support social-ecological resilience in flammable landscapes: A structured approach for natural resource managers and other stakeholders.](#) Research Note RMRS-RN-92. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 41 p.

13. **Higuera, P.E.**, Metcalf, A.L., McWethy, D.B., Balch, J.K. Skip the fireworks this record-dry Fourth of July, over 150 wildfire scientists urge the US West. *The Conversation*. June 30, 2021. *Invited. Covered on NRP Weekend Edition.
12. **Higuera, P.E.**, Shuman, B.N., and #Wolf, K.D. 2021. Rocky Mountain forest burning more now than any time in the past 2,000 years. *The Conversation*. June 14, 2021. *Invited public-facing summary.
11. **Higuera, P.E.**, and Abatzoglou, J.T. 2021. [Record-setting climate enabled the extraordinary 2020 fire season in the western United States](#). *Global Change Biology*, 27: 1-2 doi:10.1111/gcb.15388 *Invited Editorial
10. **Higuera, P.**, Dodson, E., Metcalf, A., and Dobrowski, S. September 22, 2020. [There will be more wildfire. What should we do?](#) *The Washington Post* *Invited Opinion
9. **Higuera, P.E.** 2019. First- and Second-order Fire Effects. In: Manzello S. (eds) *Encyclopedia of Wildfires and Wildland-Urban Interface (WUI) Fires*. Springer. <https://link.springer.com/referencework/10.1007/978-3-319-51727-8>
8. **Higuera, P.**, Hoffmann, H.M., Miller, S.R., and Saxer, S.R. 2019. [Climate change, population demographics, and wildfire planning in the West](#). *Trends*, the e-newsletter of the American Bar Association's Environment, Energy, and Resources Section.
7. **Higuera, P.E.**, A.J. Larson, and E.C. Metcalf. October 28, 2017. [Learning to live with Western wildfires](#). *Bozeman Daily Chronicle*, Bozeman, MT. *Invited Opinion
6. **Higuera, P.E.** 2015. Taking time to consider the causes and consequences of large wildfires. *Proceedings of the National Academy of Sciences*. 112: 13137-13139. *Invited Editorial
5. **Higuera, P. E.**, J. L. Barnes, M. L. Chipman, M. Urban, and F. S. Hu. 2011. Tundra fire history over the past 6000 years in the Noatak National Preserve, northwestern Alaska. *Alaska Park Science* 10:37-41.
4. McWethy D.B., S.T. Gray, **P.E. Higuera**, J.S. Littell, G.T. Pederson, A.J. Ray, and C. Whitlock. 2010. Climate and terrestrial ecosystem change in the U.S. Rocky Mountains and Upper Columbia Basin: Historical and future perspectives for natural resource management. Natural Resource Report NPS/GRYN/NRR—2010/260. National Park Service, Fort Collins, Colorado.
3. **Higuera, P.E.**, D.G. Gavin, P.D. Henne, and R.F. Kelly. 2010. Recent advances in the analysis and interpretation of sediment-charcoal records. *PAGES Newsletter*, 18: 57-59.
2. **Higuera, P. E.** 2006. Late Glacial and Holocene Fire History in the Southcentral Brooks Range, Alaska: Direct and Indirect Impacts of Climatic Change on Fire Regimes. Ph.D. Dissertation. University of Washington, Seattle.
1. **Higuera, P. E.** 2002. Reconstructing fire regimes with charcoal and pollen from small hollows: a calibration with tree-ring records of fire. MS Thesis. University of Washington, Seattle.

SELECTED PROFESSIONAL PRESENTATIONS, OF > 100 (* INDICATES INVITED TALK)

(Graduate student directly advised #; post-doc @)

- ***Higuera, P.E.**, M.W. Cook, J.K. Balch, E.N. Stavros, A. Mahood, and L.A. St Denis. 2023. "Shifting social-ecological fire regimes explain rapidly increasing home and structure loss from Western wildfires." **10th International Fire Ecology and Management Congress, Monterey, California** (talk).

- ***Higuera, P.E.** Fire, climate change, and the resilience of Rocky Mountain forests. 2022. “Fire impacts at the Earth surface across space and time” a conference by the European Geosciences Union Galileo, Bad Belzig, Germany, 28 March – 1 April.
- ***Higuera, P.E.**, B.N. Shuman, #K.D. Wolf Rocky Mountain subalpine forests now burning more than any time in recent millennia. 2021. Annual meeting of the **Ecological Society of America, Cyberspace.** (talk)
- *@Davis, K. T., **P. E. Higuera**, S. Z. Dobrowski, Z. A. Holden, T. T. Veblen, M. T. Rother, and S. A. Parks. 2019. Low-elevation forests have crossed critical climate thresholds for post-fire tree recruitment. **Annual meeting of the North American Chapter of the International Association of Landscape Ecology, Fort Collins, CO.** (talk)
- *@Davis, K. T., **P. E. Higuera**, S. Z. Dobrowski, and #K. D. Wolf. 2019. Fuel treatments as a means for mitigating fire-catalyzed forest change. **8th International Fire Ecology and Management Congress, Tucson, AZ.** (talk)
- Miller, C., Black, A., **Higuera, P.E.**, Metcalf, E.C., Metcalf, A.L., McWethy, D.M, and Clarke, L. Demystifying Resilience to Wildfire. 2019. A Fire Circle presentation (90-min.) at the **8th International Fire Ecology and Management Congress, Tucson, AZ.** (workshop)
- ***Higuera, P. E.**, T. W. Hudiburg, K. Bartowitz, K. K. McLauchlan, B. N. Shuman, #K. D. Wolf, D. P. Pompeani, B. Chileen, and M. Parish. 2019. The Big Burns Project: Causes and Consequences of Fire-regime Variability in Rocky Mountain Subalpine Forests. **20th Congress of the International Quaternary Association, Dublin, Ireland.** (talk)
- Higuera, P. E.**, T. W. Hudiburg, K. Bartowitz, K. K. McLauchlan, B. N. Shuman, #K. D. Wolf, D. P. Pompeani, B. Chileen, and M. Parish. 2018. A framework for understanding, testing, and anticipating the ecosystem consequences of wildfire activity over space and time. Annual fall meeting of the **American Geophysical Union, San Francisco, CA.** (talk)
- Higuera, P.E.**, T.W. Hudiburg, K.M. McLauchlan, B.A. Shuman, J.A. Hicke. 2017. Causes and Consequences of Fire-regime Variability in Rocky Mountain Subalpine Forests. Annual meeting of the **Ecological Society of America, Portland, OR.** (poster)
- #Hankin, L.E., **P.E. Higuera**, @K.T. Davis, and S.Z. Dobrowski. 2017. Seasonal to annual climate impacts post-fire conifer regeneration in the Northern Rockies. 102nd Annual meeting of the Ecological Society of America, Portland, OR. (poster)
- ***Higuera, P.E.** 2016. Coupled climate-fire-ecosystem dynamics from decades to millennia. Fall Meeting, **American Geophysical Union, San Francisco, CA.** (talk)
- Higuera, P.E.**, T.W. Hudiburg, and J.A. Hicke. 2015. Combining paleoecology and ecosystem modeling to study forest ecosystem consequences of wildfires from decades to millennia. Fall Meeting, **American Geophysical Union, San Francisco, CA.** (talk)
- #Hoecker, T.J., F.S. Hu, R. Kelly, and **P.E. Higuera**. 2015. Spatiotemporal Trends in late-Holocene Fire Regimes in Arctic and Boreal Alaska. Annual meeting of the American Geophysical Union, San Francisco, CA. (talk) **Outstanding Student Paper Award*
- ***Higuera, P.E.** 2015. Taking time to consider the causes and ecosystem consequences of fire-regime variability. **6th International Fire Ecology and Management Congress, San Antonio, TX.** (talk)
- #Young, A.M., **P.E. Higuera**, P.A. Duffy, F.S. Hu, and L. Boschetti. 2014. Climatic Controls of Wildfire in the Boreal Forest and Arctic Tundra Biomes across Multiple Spatial and Temporal Scales. Fall Meeting, **American Geophysical Union, San Francisco, CA.** (talk)
- ***Higuera, P. E.**, Calder, W.J., Chipman, M., Gill, J., and R. Kelly. 2014. IGNITE: Why we study the past: PaleoEcology in a time of rapid global change. Annual meeting of the **Ecological Society of America, Sacramento, CA.** (talk)

- Crausbay, S., **Higuera, P.E.**, Brubaker, L.B., and Sprugel, D.G. 2014. Fire as a catalyst for rapid ecological change in the Puget Lowlands over the Holocene. Annual meeting of the **Ecological Society of America, Sacramento, CA.** (talk)
- #Kemp, K.B., **Higuera, P.E.**, and Morgan, P. 2014. Post-fire tree recruitment in the U.S. Northern Rockies: the influence of seed source proximity and environmental conditions. Annual meeting of the **Ecological Society of America, Sacramento, CA.** (talk)
- *@Morris, J.L. and **P.E. Higuera.** 2014. Holocene fire histories from the subalpine interior of Tasmania, Australia. **International Association of Wildland Fire: Large Wildland Fires: Social, Political and Ecological Effects, Missoula, MT.** (talk)
- ***Higuera, P.E.**, R.F. Kelly, and F.S. Hu. 2013. Resilience and sensitivity of high-severity fire regimes to climatic variability from centuries to millennia. Fall Meeting, **American Geophysical Union, San Francisco, CA.** (talk)
- ***Higuera, P.E.**, J.T. Abatzoglou, J.S. Littell, and P. Morgan. 2013. The changing nature of fire-climate relationships in the U.S. Northern Rockies, 1902-2008. **VII Southern Connection Congress, Dunedin, New Zealand.** (talk)
- #Dunnette, P.V. and **P.E. Higuera.** Long-term interactions among climate, fire, and biogeochemical cycling in a Rocky Mountain subalpine watershed. **Ecological Society of America, Portland, OR.** (poster)
- Higuera, P.E.**, M. Chipman, J. Barnes, P.A. Duffy, and F.S. Hu. 2011. Interannual- to millennial-scale interactions among climate, vegetation, and fire in tundra ecosystems of Alaska, USA. **Ecological Society of America, Austin, TX.** (talk)
- ***Higuera, P.E.**, M. Chipman, J.A. Allen, L. Brubaker, C. Whitlock, F.S. Hu. 2009. Interactions of climate, vegetation, and fire during the Holocene: lessons from high-latitude and high-elevation ecosystems. **American Geophysical Union, San Francisco, CA.** (talk)
- ***Higuera, P.E.**, M. Chipman, J.A. Allen, S. Rupp, M. Urban, F.S. Hu. 2008. Tundra fire regimes in the Noatak National Preserve, northwestern Alaska, since 6000 yr BP. **International Association of Wildland Fire, Jackson Hole, WY.** (talk)
- Higuera, P.E.**, L.B. Brubaker, P.M. Anderson, F.S. Hu, B. Clegg, T. Brown, and S. Rupp. 2005. The relative importance of vegetational vs. climatic controls on post-glacial fire regimes in the southern Brooks Range, AK. **Ecological Society of America, Montreal, Quebec.** (talk)
- ***Higuera, P.E.**, M.E. Peters, D.G. Gavin. 2004. Holocene fire-history records from lake sediments: improving accuracy and precision through quantitative modeling. **International Association for Landscape Ecology, US Regional Association, Las Vegas, Nevada.** (talk)
- Higuera, P.E.**, L.B. Brubaker, and D.G. Sprugel. 2002. Reconstructing fire regimes with small hollows: A calibration with tree-ring records. **Ecological Society of America, Tucson, AZ.** (talk)

EXTERNAL GRANTS AND AWARDS: \$3.9 MILLION SINCE 2006, \$2.1 TO UM (2015→)

- 2023-2027 National Science Foundation, Arctic Natural Sciences ([OPP-2215120](#)):
“Collaborative Research: The Past, Present, and Future of Boreal Fire Feedbacks” Higuera (co-PI), Brian Buma (PI, CU Denver), Melissa Chipman (co-PI, Syracuse Univ.), and Chad Hoffman (Colorado State Univ.). Total: **>\$1.5 million (UM \$641,023)**.
- 2022-2024 USDI, BLM, Joint Fire Science Program, Graduate Research and Innovation: “Impacts of wildfires and climate change on western larch regeneration” Spencer Vieira (student investigator), Davis and Higuera (co-PIs). Total: **\$28,685**.
- 2022-2023 USGS Northwest Climate Adaptation Science Center graduate fellowship: “Impacts of wildfires and climate change on western larch regeneration” Spencer Vieira (student investigator), Davis and Higuera (co-PIs). Total: **\$26,663**.
- 2021-2023 The Nature Conservancy (*non-competitive): “Western US Forest Post-fire Regeneration” Kim Davis (PI), Higuera (co-PI). Total: **\$84,369**.
- 2020-2022 USGS North-Central Climate Science Center, Competitive Research Grant: “Post-fire conifer regeneration and reforestation strategies under changing climate conditions.” Kimberley Davis (PI), with co-PIs Higuera, S. Dobrowski, Z. Holden (USFS). Total: **\$210,414**.
- 2019-2023 USGS North-Central Climate Science Center, Cooperating Partner with CU Boulder (lead institution), “Social-ecological resilience to changing wildfire activity.” Higuera (UM PI). Total: **\$176,517**.
- 2019-2022 USFS, Rocky Mountain Research Station cooperative agreement (*non-competitive): “PaleoEcological evaluation of fire and vegetation transformations in central Colorado.” Higuera (UM PI), and co-PIs Sean Parks, Jonathan Coop, Shelley Crausbay. Total: **\$34,969**.
- 2018-2021 USDI, BLM, Joint Fire Science Program, Graduate Research and Innovation: “Impacts of burn severity, microclimate, and soil properties on initial post-fire tree regeneration.” Kyra Wolf (student investigator), Higuera and Davis (co-PIs). Total: **\$24,986**.
- 2017-2023 National Science Foundation, Division of Environmental Biology ([DEB-1655121](#)): “Collaborative Research: Causes and consequences of fire-regime variability in Rocky Mountain forests.” Higuera (PI), and co-PIs T. Hudiburg (U. Idaho), K. McLauchlan (Kansas St. Univ.), B. Shuman (U. Wyoming). Total: **\$860,087 (UM \$351,300)**.
- 2016-2020 USDI, BLM, Joint Fire Science Program: “Identifying ecological and social resilience in fire-prone landscapes” Higuera (PI), and co-PIs Elizabeth Covelli Metcalf, Alex Metcalf, Dave McWethy, and Carol Miller (USFS). Total: **\$290,560 (UM \$227,926)**.
- 2016-2021 USDI, BLM, Joint Fire Science Program: “Climate variability and post-fire forest regeneration in the Northern Rockies.” Higuera (PI), and co-PIs Kimberly Davis (principal author), S. Dobrowski, and Sean Parks (USFS). Total: **\$355,327**.
- 2014-2017 USDI, BLM, Joint Fire Science Program, Graduate Research and Innovation: “Spatially-explicit impacts of climate on past, present, and future fire regimes in Alaskan boreal forest and tundra ecosystems.” Adam Young (student investigator), Higuera (PI). Total: **\$24,999**.

- 2013-2018 National Science Foundation, Macrosystems Ecology ([1241846](#)): “Collaborative Research and NEON: MSB Category 2: PalEON - a PaleoEcological Observatory Network to Assess Terrestrial Ecosystem Models.” Jason McLachlan, Notre Dame (lead PI), Higuera (UIdaho / UMontana lead), et al. Total: > \$4 million, University of Idaho / Montana, **\$449,778**.
- 2012-2015 USDI, BLM, Joint Fire Science Program, Graduate Research and Innovation: Interactions Among Climate, Wildfire, and Tree Regeneration at Lower Treeline in the Northern Rockies. K. Kemp (student investigator), Higuera (PI). Total: **\$24,999**.
- 2011-2016 National Science Foundation, Research Coordination Network ([1145815](#)), “RCN: The Novus project for integrating paleo- and neo-ecosystem ecology.” Kendra McLauchlan, Kansas State University (PI), and co-PIs Daniel Gavin and Philip Higuera. Total: \$505,409, University of Idaho, \$0.
- 2010-2015 National Science Foundation, Partnerships for International Research and Education ([0966472](#)): “PIRE: Wildfire feedbacks and consequences of altered fire regimes in the face of climate and land-use change in Tasmania, New Zealand, and the western U.S.” Cathy Whitlock (PI), Higuera (co-PI, UIdaho lead), et al. Total: > \$3,800,000 million, University of Idaho, **\$335,203**.
- 2010-2015 National Science Foundation, Arctic System Science ([1023669](#)): “Collaborative Research: Integrating paleoecological analysis and ecological modeling to elucidate the responses of tundra fire regimes to climate change.” Feng Sheng Hu (PI) and co-PIs, Mike Dietze, Paul Duffy, and Philip Higuera (UIdaho lead). Total: > \$1,100,000 (+ \$370 k logistical support), University of Idaho, **\$456,612**.
- 2006-2009 National Park Ecological Research Post-doctoral Fellowship, PI: www.esa.org/nper/ **\$138,000**.
- 2006-2010 USDI, BLM, Joint Fire Science Program: “Reconstructing fire regimes in tundra ecosystems to inform a management-oriented ecosystem model.” Higuera, co-PI and principal author; Feng Sheng Hu (PI). Total **\$306,780**.
- 2000-2003 National Science Foundation Graduate Research Fellowship

SCIENCE COMMUNICATION: TALKS TO MANAGERS, POLICY MAKERS, MEDIA, AND PUBLIC FROM OVER ONE-DOZEN SINCE 2016

- March, 6, 2025: Invited keynote speaker for the IEEE Aerospace Conference, Big Sky, MT, “[Wildfires are inevitable. How can we reduce human suffering?](#)”
- June 13, 2024: Invited panel presenter for the National Academies of Sciences workshop “[The Social-Ecological Consequences of Future Wildfire in the West](#)” (@ 1:25).
- March 3, 2022: Invited presenter (1 of 3) for the Montana State Legislature’s Environmental Quality Council meeting, as part of a 1-hr session on “[Wildfire Behavior and Mitigation](#).”
- Sep. 16, 2021: Invited panelist/presenter (1 of 3) for the Cary Institute of Ecosystem Studies’ virtual public event “[Wildfire in the Western US: Causes, Consequences, & Adaptation](#)”
- Sep. 1, 2021: Invited panelist/presenter (1 of 3) for the SciLine media brief titled “[Wildfires: Climate connections & community impacts](#),” including a national audience of journalists.
- March 4, 2021: Invited public presentation, Aspen Center for Environmental Studies’ Naturalist’s Nights, “Colorado’s record-setting 2020 fire season in the context of the past 6000 years”
- Dec. 8, 2020: Invited public presentation, “The past and future ecological effects of wildfire,” as part of a public session, “Wildfire and Wildfire Smoke: Effects on ecosystems, agricultural

works, horses, and wine grapes,” [The National Academies of Sciences, Engineering, Medicine, Board on Agriculture and Natural Resources](#).

July 9, 2020: Public lecture “Wildfire and Climate Change in the West” delivered to audience over two dozen participants, organized by the Bitterroot Climate Action Group.

April 5, 2019: Presenter and panelist at a wildfire workshop for journalists, organized by the Institute for Journalism & Natural Resources, including over two dozen local and regional journalists.

May 30, 2019: Invited presentation for the 19th Institute for Natural Resources Law Teachers, Missoula, MT: The Inevitability of wildfire in the West: past, present, and future

May 31, 2019: Participant, one-day workshop titled “Climate Ready Communities: building Resiliency in Missoula County,” sponsored by the Missoula Chamber of Commerce, Climate Smart Missoula, and the City of Missoula. I was invited to attend this workshop to contribute to wildfire-related topics.

May, 2020: Presenter and panelist at a wildfire workshop for journalists, organized by the Institute for Journalism & Natural Resources, including over two dozen national journalists.

February 27, 2018: Talk, UM’s Community Lecture Series, The inevitability of wildfires: fire history and the future of fire.

April 20, 2018: Presenter and panelist at “The Future of Wildfire,” a workshop organized by the Institute for Journalism & Natural Resources, including 23 local and regional journalists.

October 14, 2018: Presenter at the “Science of National Forest Planning Symposium,” organized by the Custer-Gallatin National Forest as part of their Forest Plan revision process: Changing Fire Regimes and Forest Resilience: past, present, and future

November 7, 2018: Talk, “Science on Tap,” Flathead Lake Brewery: The Inevitability of wildfire in the West: past, present, and future

October 2017: Panelist, “Living with Fire” public evening event, sponsored by the Missoula-based non-profit Treesource.org, dedicated to “forest journalism for a sustainable future.”

July 2016: Presenter and participant, “Learning from a Legacy of Wilderness Fire in the Bob Marshall Wilderness Complex” workshop, Spotted Bear Ranger Station, sponsored by the Northern Rockies Fire Science Network.

SCIENCE COMMUNICATION: SELECTED MEDIA FROM OVER 45 PIECES SINCE 2016, INCLUDING RESEARCH COVERAGE, EXPERT INPUT, AND PUBLIC OUTREACH

November 2025: “[Analysis: Forest Service going 'full suppression' on wildfires despite fuels build-up](#)” *The Bozeman Daily Chronicle*

October 2025: “[What happens to wildlife during a wildfire?](#)” *The Big Why, Montana Public Radio*,

January 2025: “[As Big Sky firefighters return from L.A. wildfires, experts warn of growing risk at home](#)” *Explore Big Sky*.

August 2024: “[These Oregon ranchers say the losses from summer range fires will be huge](#)” *NPR National News*.

March 2024: “[Montana researchers say quick wildfire suppression leads to larger, more intense fires](#)” *Daily Montanan*.

Aug. 2023: “[5 ‘surprising’ areas where wildfire risk is increasing](#)” *The Hill*.

March 2023: “[Increasingly Large and Intense Wildfires Hinder Western Forests’ Ability to Regenerate](#)” *Inside Climate News*.

Feb. 2023: “[Why Western wildfires are becoming more destructive](#)” *High Country News*, reposting our piece in *The Conversation*.

- Feb. 2023: "[The rate of structure loss due to wildfires is growing, researcher says](#)," *Montana Public Radio*.
- Feb. 2023: "[Because of humans, wildfires are burning more homes](#)," *The Missoulian*.
- Jan. 2023: "[In a warming world, California's trees keep dying](#)," *High Country News*.
- March 2022: "[Wildfire trends outpace mitigation measures](#)" *Bozeman Daily Chronicle*.
- Jan. 2022: "[How climate change primed Colorado for a rare December wildfire](#)" *NBC News*
- Feb. 2022: "[Ep. 24: Climate change impacts on high severity, low frequency fire regimes with Phil Higuera](#)" *Life with Fire* podcast, by Amanda Monthei.
- Dec. 2021: "[How climate change intensified Colorado fires](#)" *The Washington Post*
- Dec. 2021: "[A rare winter wildfire is a sign of climate change lengthening fire season](#)" *Montana Public Radio*
- Oct. 2021: "[La Niña is about to take the Southwest drought from bad to worse](#)" *CNN*
- July 2021: "[The Climate Change Link to More and Bigger Wildfires](#)" *Montana Public Radio*.
- July 2021: "[These Fires ARE Different, with Phil Higuera and Kyra Wolf](#)" *A New Angle* podcast.
- July 2021: "[Fire scientists report record low fuel moisture in western Montana](#)," *NBC Montana*.
- July 2021: "[Skip the fireworks this record-dry July 4th, fire scientists urge the U.S. West](#)," *PBS News Hour*, reposting our piece in *The Conversation*.
- July 2021: "[Experts recommend leaving fireworks unlit this 4th of July](#)," *National Public Radio*.
- July 2021: "[Today's Wildfires Are Taking Us into Uncharted Territory](#)" *Scientific American*.
- June 2021: "[High-elevation forests now burning more frequently than any time in the past 2,000 years](#)" *Montana Free Press*
- June 2021: "[Fire Ecology Professor Says Ecosystem In 'Uncharted Territory'](#)" *Montana Public Radio*
- June 2021: "[Rocky Mountain Forest Fires More Frequent Than Ever, Study Finds](#)" *Voice of America*
- June 2021: "[High-elevation forests in the Rockies are burning more now than in the past 2,000 years](#)" *CNN*
- October 2020: "[Living with fire: Officials, environmentalists wrestle with how to best manage forests](#)," *The Bozeman Daily Chronicle*.
- October 2020: "[Off the charts: Dryness stat shows why West is burning](#)" *E&E News*
- October 2020: "[Colorado contends with record-setting wildfires](#)," *ClimateWire*.
- October 2020: "[Late-Season Wildfires Rampage Through Colorado](#)," *The New York Times*.
- September 2020: "[The science connecting wildfires to climate change](#)" *National Geographic*
- September 2020: "[The new normal? Fire watchers fear we're just getting started](#)," *Missoulian*.
- September 2020: "[How an easterly wind, hotter summers could fuel more devastating wildfire on Western slopes of Cascades](#)," *Seattle Times*.
- September 2020: "[The science connecting wildfires to climate change](#)," *National Geographic*.
- July 2020: "[Full-court Suppress](#)," *Montana Free Press*.
- May 2020: "[Scientists Are Bringing Their Research Home During COVID-19 Closures](#)" *Montana Public Radio*.
- October 2019: "[Ecologist Helps Redefine Our Perspective on Forest Fires](#)," Features in "Stories from the field" series by the non-profit organization *Engineers & Scientists Acting Locally*.
- August 2019: "[Why the Arctic is smoldering](#)," *BBC Future*.
- July 2019: "[Withstanding wildfire with words: study seeks best ways to recover](#)," *Missoulian*.
- June 2019: "[Wildfire smoke is here to stay](#)," *Outside Magazine*.
- March 2019: "[Fire study shows landscapes such as Bitterroot's Sapphire Range too hot, dry to restore trees](#)," *Missoulian*.

- January 2019: "[Why the shutdown could mean a worse wildfire season](#)," *NPR News*.
- Feb. 2018: "[New study Finds Climate Change Reducing Forest Regrowth After Fires](#)," *Montana Public Radio*.
- September 2018: "[Will more logging ease wildfires? Canada holds answers](#)," *Wyoming Public Media*
- November 2017: "[Collaborative Group Seeks Consensus After Montana's Summer of Smoke](#)" *Montana Public Radio*
- November 2017: The controversies that defined the 2017 fire season—and foreshadow the fires next time, *Missoula Independent*
- October 2017: "[Get used to it: Fire experts warn summer smoke and flames aren't going away](#)," *The Missoulian*
- October 2017: '[Gone are the days we can overwhelm a fire with mass](#)' in the *Great Falls Tribune*.
- October 2017: "[Get used to wildfire, and rethink 'natural processes' panelists say](#)" *Montana Public Radio*.
- October 2017: "[The \\$2 billion question: spend on fighting fires or preventing them?](#)" *Market Place, American Public Media*
- September 2017: "[Zinke's fire memo calls for aggressive forest thinning](#)," *High Country News*.
- September 2017: "[The West's dramatic wildfire season, explained](#)," *High Country News*. (Re-publishing of the *CityLab* piece)
- September 2017: "[The West is on fire. Get used to it](#)," *CityLab*.
- May 2016: "[Global Warming to Spur More Fires in Alaska, in Turn Causing More Warming](#)," *Inside Climate News*

UNIVERSITY TEACHING

- 2015→ Professor (2021-), Associate Professor (2015-2021), Univ. of Montana, Dept. of Ecosystem & Conservation Sciences:
Fire Ecology (FORS 333, 3 cr), annually 2015 →
Fire Management and Environmental Change (FORS 230, 3 cr), annually 2017 →
 Taught solo in 2017 and co-teach 1.5 credits since.
Elements of Ecological Restoration (NRSM 265, 3 cr), co-taught 1-2 credits, annually 2015-2024
Fire & Disturbance Ecology (FORS 595, 3 cr), 2017, 2019, 2021, 2023, 2025
Living with Wildfire (FORS 595-ST), 2020 (1 cr), 2024 (2 cr)
- 2010-2015 Assistant Professor, University of Idaho, College of Natural Resources:
Fire Ecology and Management (FOR 326/426, 3 cr), annually, 2010-2014
Fire Behavior (FOR 450, 3 cr), annually, 2010-2015
Computational Data Analysis and Visualization (FOR 504, 3 cr), 2012, 2014
Altered Ecologies (FOR 504-02, 3 cr), 2013
Global Fire and Ecological Feedbacks (FOR 504-02, 3 cr), 2011
- 2007-2009 Adjunct Instructor, Montana State University, Department of Earth Sciences:
Biogeography (GEOG 302), 2008 (co-instructor), 2009
Weather and Climate (GEOG 303), 2008
Mountain Geography (GEOG 430), 2008

Advanced Biogeography (GEOG 505), 2009

POST DOC, GRADUATE, AND UNDERGRADUATE TRAINING AND ADVISING

Post Docs (4): William “Buzz” Nanavati (2023→), Jamie Peeler (2021→), Kimberly Davis (2016-2020), Jesse Morris (2013-2015), Kelly Derr (2013-2014)

Graduate Students, primary (7):

Completed:

Kyra Clark-Wolf (PhD, Systems Ecology, U of MT, 2017-2022), Paul Dunnette (MS, U of ID, 2010-2013), Lacey Hankin (MS, Systems Ecology, U of MT, 2016-2018), Tyler Hoecker (MS, U of ID and U of MT, 2014-2017), Kerry Kemp (PhD, U of ID, 2010-2015), Spencer Vieira (MS, Systems Ecology, U of MT, 2021-2023)
Adam Young (PhD, MS in Stat. Sci., U of ID, 2011-2018)

Current:

NONE.

Graduate Students, committee member (23):

Past:

Hannah Alverson (MS, Systems Ecology, UM, 2023-2025), Carolyn Barrett (PhD, U of IL, 2006-2012), Kristina Bartowitz (PhD, U of ID, 2017-2022), Julia Berkey (MS, U of MT, 2018-2020), Nolan Brewer (MS, U of ID, 2009-2012), Polly Buotte (PhD, U of ID, 2014-2015), David Busby (Geosciences, UM, 2021-2022), Mark Kreider (PhD, Systems Ecology, UM, 2021-2024), Carl Davidson (MS, U of IL, 2011-2012), Haley Hodge (MS, U of MT, 2018-2020), Melissa Jaffe (MS, U of MT, 2020-2022), Ryan Kelly (PhD, U of IL, 2008-2014), Katie Morrison (MS, U of ID, 2012-2014), Lauren Perreault (MS, ID St. Univ., 2009-2010), Seff Propios (MS, U of MT Geography, 2019-2020), Robin Rank (MS, U of MT, 2019-2021), Charlotte Reed (PhD, Ecology and Evo. Biology, UM, 2021-2025), Vanessa Selimovic (PhD, Chemistry, U of MT, 2015-2020), Kara Yedinak (PhD, Atm. Science, WA St. Univ., 2009-2013).

Current:

Brooke Bannerman (PhD, Ecology and Evo. Biology, UM, 2022-), Gibson Blankenship (Systems Ecology, UM, 2024-), Sophia Graham (PhD, Society and Conservation, UM, 2024-), Milan Vinks (PhD, Wildlife Biology, UM, 2023-).

Undergraduate research projects/theses (13):

Junior Burks (U of MT, Davidson Honors College, Envi. Sci. and Sustainability, 2023-2024); Madison Miller (U of MT, Davidson Honors College, Chemistry, 2020-2021); Allison Hendrix (U of MT, Wildlife Biology, 2018-2019), Lawrence Crofutt (U of MT, Forestry, 2017-2018), Lucas Townsend (U of MT, Forestry, 2016-2017), Cassidy Robertson (Ecology and Con. Bio., U of ID, 2014-2015); Patrick Flannigan (Env. Sci., U of ID, 2013); Shannon Pauli (Fire Ecology and Management, U of ID, 2012-2013); Cody Parker (Env. Sci., U of ID, 2012-2013); Travis Reeves (Env. Sci., U of ID, 2011); Alison Kennedy (Montana St. Univ., 2007); Andrew Whitmore (Montana St. Univ., 2006-2007); Jason Smith (U of WA, 2000-2001).

UNIVERSITY SERVICE

U of MT

- 2021 Member, W.A. Franke College of Forestry and Conservation Strategic Planning Committee
- 2020-2021 Member, W.A. Franke College of Forestry and Conservation Graduate Affairs Committee.
- 2017-2021 Director, Systems Ecology Intercollegiate Graduate Program (MS, PhD), University of Montana.
- 2015-2018 Member, W.A. Franke College of Forestry and Conservation, Space Committee
- 2015-2016 Member, University Ecology Programs and Organization Review Committee

U OF ID

- 2014-2015 Member, College of Natural Resources, College Curriculum Committee
- 2014-2015 Member, College of Natural Resources, committee on lab space
- 2013-2014 Member, College of Natural Resources, committee to reevaluate tenure and promotion criteria
- 2013-2015 Member, Department of Forest, Rangeland, and Fire Sciences, Graduate Program Committee
- 2013-2014 Member, Department of Forest, Rangeland, and Fire Sciences, Forest Biologist search committee
- 2013-2014 Member, Department of Forest, Rangeland, and Fire Sciences, tenure and promotion review committee
- 2011-2012 Member, Department of Forest, Rangeland, and Fire Sciences, Department Head search committee
- 2009-2015 Provided over 25 invited guest lectures in forest resources, rangeland ecology and management, geography, and environmental science courses.

PROFESSIONAL AND PUBLIC SERVICE

- 2024 Hosted a two-day COMPASS Science Communication workshop for research and graduate students in the Missoula community, as part of an NSF grant.
- 2024 Member, NSF proposal review panel (virtual)
- 2021 Registered expert on wildfire science with AAAS' [SciLine](#) program, aimed to "help journalists understand the latest evidence and put it into context."
- 2020 Member, NSF proposal review panel (virtual)
- 2017-2018 Deevey Award Coordinator, Paleoecology Section, Ecological Society of America
- 2017 Member, NSF proposal review panel, x 2
- 2015 Member, NSF proposal review panel.
- 2013-2014 Chair, Paleoecology Section of the Ecological Society of America.
- 2013 DeVleig Distinguished Lecturer Series, McCall Outdoor Science School, U. Idaho.
- 2012-2013 Vice Chair, Paleoecology Section of the Ecological Society of America.

- 2007 → Development and deployment of programs for charcoal analysis and chronology development for sediment records: *CharAnalysis*, *MCAgeDepth*, *CRSModel*.
- 2006-2009 Secretary, Paleoecology Section of the Ecological Society of America
- 2006-2012 Instructor, North Cascades Institute, Diablo, Washington. Designed and co-taught two-day courses on forest and fire ecology for adults each summer.
- 2005, 2010 Co-organized and led workshop for 20-30 participants on reconstructing fire regimes with sediment charcoal records at the Ecological Society of America meeting.
- 2007 → Ad hoc peer review for journals and other publications (avg. 8/yr): *Annals of the Association of American Geographers*, *Biology Letters*, *Canadian Journal of Forest Research*, *Climatic Change*, *Earth's Future*, *Ecology*, ***Ecology Letters***, *Ecological Monographs*, *Ecosphere*, *Ecosystems*, *Fire*, *Fire Ecology*, *Forest Ecology and Management*, *Frontiers in Ecology and the Environment*, *Global Change Biology*, *International Journal of Wildland Fire*, Island Press, *Journal of Applied Ecology*, *Journal of Biogeography*, *Journal of Ecology*, *Journal of Paleolimnology*, *Journal of Quaternary Science*, *Journal of Vegetation Science*, *Mires and Peat*, **National Academy of Sciences**, ***Nature***, *Nature Communications*, *New Phytologist*, *Palaeogeography Palaeoclimatology Palaeoecology*, *PLoS ONE*, *Philosophical Transactions of the Royal Society – Biological Sciences*, *Polar Science*, ***PNAS***, *The Holocene*, *Quaternary International*, *Quaternary Research*, *Quaternary Science Reviews*.
- 2007 → Ad hoc peer review for scientific funding agencies (avg. 3/yr, excluding NSF panels): U.S. National Science Foundation, National Aeronautics and Space Administration, Joint Fire Science Program, Swiss National Science Foundation, ANR (France), NSERC (Canada), New Netherlands Polar Programme.

PROFESSIONAL DEVELOPMENT

- 2019 “Elevating Wildfire Conversations in Montana: A COMPASS Workshop, Flight, & Field Trip.” One-day science-communication workshop.
- 2018 “Sparking a dialogue on wildfire: A COMPASS communication workshop,” Missoula Montana. One-day science-communication workshop.
- 2018 “Summer Institute on Scientific Teaching,” Univ. of Montana. A 3-day workshop focused on evidence-based, inclusive teaching methods, sponsored by Yale Poorvu Center for Teaching & Learning and the Howard Hughes Medical Institute.
- 2015 “Selling your story: presentation skill building series,” University of Montana, Faculty Development Program. Five-class program on presentation skills for faculty.
- 2014 “Bayesian Modeling for Practicing Ecologists” One of 22 professionals selected to participate in this nine-day NSF-funded workshop at Colorado State University.
- 2011 “Stable Isotopes in the Paleoenvironment” Student in five-day NSF-funded short course at Kansas State University.
- 2011 COMPASS one-day workshop for science communication, participant.

HONORS AND AWARDS

- 2024 University of Montana Faculty Merit Award
- 2021 Research featured as one of five on [NSF's Year in Review](#)
- 2020 University of Montana Faculty Merit Award
- 2019 Steve Running Research Award, WA Franke College of Forestry and

- Conservation, University of Montana.
- 2018 University of Montana Faculty Merit Award
- 2018 Clarivate Analytics Highly Cited Scientist, of 6000 globally from 21 fields, for nine highly cited publications, measured over the previous five years.
- 2012 Outstanding Research Award, College of Natural Resources, University of Idaho
- 2009 Awarded, USGS Mendenhall Postdoctoral Fellowship (declined)
- 2004, 2nd place, Edward S. Deevey Award for Excellence in Paleoecology, presented to
2005 the best student presentation in paleoecology at the Ecological Society of America Meeting, Portland, OR, and Montreal, Quebec.
- 2003 1st place, student poster competition, Study of Environmental Arctic Change open science meeting, Seattle, WA. \$1000 award to attend an international meeting.
- 2001 2nd place, Edward S. Deevey Award for Excellence in Paleoecology, presented to the best student presentation in paleoecology at the Ecological Society of America Meeting, Madison, WI.
- 2000 Xi Sigma Pi Forestry Honors Society, University of Washington.
- 1998 Elbert C. Cole Award for outstanding performance in the Dep. of Biology, Middlebury College.

PROFESSIONAL ASSOCIATIONS

- 2012 → Association for Fire Ecology
- 2006 → International Paleofire Working Group
- 2006 → American Geophysical Union
- 2000 → Ecological Society of America, Paleoecology Section member

INVITED LECTURES AND SEMINARS

- 2023 University of Montana, Geosciences seminar series
- 2022 University of Montana, Forestry and Conservation seminar series
- 2022 University of Wyoming, Dep. of Geology, Distinguished Speakers Series
- 2021 Pennsylvania State University, Earth Talks seminar series
- 2021 University of Montana, Health Sciences seminar series
- 2021 Rocky Mountain Biological Laboratory, summer seminar series
- 2021 International Paleofire Network Seminar Series
- 2019 USFS, Missoula Fire Science Lab Seminar Series
- 2018 Department of Earth Sciences, Montana State University
- 2017 USFS, Missoula Fire Science Lab Seminar Series
- 2016 Systems Ecology Graduate Seminar Series, University of Montana
- 2015 Department of Ecosystem and Conservation Sciences, University of Montana
- 2014 Department of Geography Climate Change Seminar, University of Idaho
- 2014 Department of Geography departmental seminar, University of Utah
- 2012 Paleoworks Master Class on charcoal analysis, Australian National University, Canberra, Australia
- 2012 Webinar to fire managers, JFSP-funded Alaska Fire Science Consortium: "Tundra burning in Alaska: rare events or harbinger of climate change?" May 24th
- 2011 Forest Ecology Seminar Series, University of Montana
- 2010 Keynote speaker, Bonanza Creek LTER Symposium, Fairbanks, Alaska
- 2009 Quaternary Ecosystem Science Training International Group, guest lecturer, France
- 2009 Department of Biology, University of Denver
- 2008 Department of Geography, University of Wisconsin

2007 Department of Ecology, Montana State University
2007 Department of Geography, University of Oregon
2006 Department of Earth Sciences, Montana State University