

Philip E. Higuera

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EDUCATION

- Ph.D. 2006** Division of Ecosystem Science, College of Forest Resources, University of Washington, Seattle.
Advisor: Dr. Linda Brubaker. Committee members: James Agee, Patricia Anderson, Daniel Gavin, Douglas Sprugel. Dissertation title: "Late glacial and Holocene fire history in the southcentral Brooks Range, Alaska: direct and indirect impacts of climatic change on fire regimes."
- M.S. 2002** Division of Ecosystem Science, College of Forest Resources, University of Washington, Seattle.
Advisors: Dr. Linda Brubaker and Dr. Douglas Sprugel. Thesis title: "Reconstructing fire regimes with charcoal and pollen from small-hollow sediments: a calibration with tree-ring records of fire".
- B.A. 1998** Middlebury College, Middlebury, VT: *magna cum laude*; High Honors, Biology, High Honors, Environmental Studies-Geology. Thesis advisors: Dr. Andrea Lloyd and Dr. Grant Meyer.

RESEARCH EXPERIENCE

- 2006-** *National Park Ecological Research Fellow, Whitlock Paleocology Lab, Montana State University:* Studying late Holocene fire regimes in subalpine forests of Colorado and developing and deploying tools for sediment charcoal analysts. Advisor: Cathy Whitlock
- 2006-** *Postdoctoral Research Scientist, Hu Quaternary Paleocology Lab, University of Illinois:* Leading Joint Fire Science Program-funded research on tundra fire regimes in northwestern Alaska and participating in National Science Foundation study of fire and climate history in central and southern Alaska.
- 2005-2006** *Research Assistant for Dr. Linda Brubaker, Paleocology Lab, University of Washington:* Continued doctoral research on vegetation-fire-climate interactions in Alaskan boreal forests.
- 2003-2005** *National Science Foundation Graduate Research Fellow, Paleocology Lab, University of Washington:* Pursued doctoral research investigating vegetation-fire-climate interactions in Alaskan boreal forests using palynology and charcoal analysis; created a simulation model to improve theory and techniques of charcoal analysis.
- 2001-2003** *Research Assistant for Dr. Linda Brubaker, Paleocology Lab, University of Washington:* Paleocology research using palynology and charcoal analysis to investigate vegetation-fire-climate interactions in Alaskan boreal forest response to climatic change.
- 2000-2001** *National Science Foundation Graduate Research Fellow, Paleocology Lab, University of Washington:* Pursued Master research calibrating small-hollow charcoal records to tree-ring records of fire on Orcas Island, Washington.
- 1999-2002** *Research Assistant for Dr. Linda Brubaker and Dr. Douglas Sprugel, Paleocology Lab, University of Washington:* Conducted paleocology research using palynology, charcoal analysis and dendrochronology to investigate the roles of climate and disturbance regimes in the development of old-growth Douglas-fir forests in western Washington.
- 1998-1999** *Research Intern for Dr. Eric Menges, Plant Ecology Lab, Archbold Biological Station, Lake Placid, Florida:* Assisted in plant ecology, conservation biology, and fire ecology research. Conducted independent research utilizing dendrochronology titled "Age structures and growth patterns of south Florida slash pine in burned pine flatwoods".

TEACHING EXPERIENCE AND TRAINING

- 2008** *Co-instructor, Biogeography, Montana State University, Department of Earth Sciences:* Teaching 1/3 of the course, focusing on ecological biogeography.
- 2007** *Co-instructor, Agricultural and Environmental Responses to Climate Change, Montana State University, Department of Earth Sciences:* Advising independent projects and teaching on ecological impacts of past climate change.
- 2007** *Co-instructor, Geography of Natural Disturbance, Montana State University, Department of Earth Sciences:* co-organized graduate-level course with Cathy Whitlock, delivered lectures, and designed and led class independent research project.
- 2007** *Undergraduate Research Advisor, MSU Department of Earth Sciences:* Recruited and advised two student projects related to fire history and climate change. Best oral presentation awarded to one student at departmental colloquium.
- 2006** *Teaching and Learning in Higher Education:* Graduate-level course focusing on teaching philosophies and techniques to prepare graduate students for academic success.
- 2004-2005** *Field-trip leader, Department of Biology, University of Washington:* Planned and led field trips focusing on forest diversity for introductory biology course.
- 2002-2005** *Guest Lecturer, College of Forest Resources, University of Washington:* Designed and presented two to three lectures a year in graduate and undergraduate courses on paleoecology, disturbance ecology, forest ecology and climate change.
- 2002** *Teaching Assistant, Forest Community Ecology, College of Forest Resources, University of Washington:* Organized labs, facilitated student learning and helped design and grade exams for this graduate-level course.
- 2000-2001** *Undergraduate thesis co-advisor, University of Washington:* Advised undergraduate honors thesis using dendrochronology to study tree growth responses to fire on Orcas Island, Washington.
- 1997** *Teaching Assistant, Introduction to Ecology, Middlebury College:* Helped organize labs, facilitated student learning and graded exams.

GRANTS AND FELLOWSHIPS

- 2006** National Park Ecological Research Post-doctoral Fellowship: provides two years of post-doctoral funding for research proposal titled "Spatial and temporal evolution of subalpine forest fire regimes during the late Holocene, Rocky Mountain National Park". www.esa.org/nper/ **\$134,000.**
- 2006** Principle author, Joint Fire Science Program grant titled "Reconstructing fire regimes in tundra ecosystems to inform a management-oriented ecosystem model", **\$306,780.**
- 2006** Contributing author, with Feng Sheng Hu, National Science Foundation grant titled "Impacts of Climatic Change on the Boreal-Forest Fire Regimes of Alaska: Lessons from the Past and Prospects for the Future", **\$548,197.**
- 2000** National Science Foundation Graduate Research Fellowship: provides three years of graduate training, including tuition waiver and stipend.

HONORS AND AWARDS

- 2004, 2005** 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, Portland, OR, and Montreal, Quebec.
- 2003** 1st place, student poster competition, Study of Environmental Arctic Change (SEARCH) open science meeting, Seattle, WA. Provided a \$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 Honor Society, University of Washington.
 1999 Honorable mention, National Science Foundation Graduate Research Fellowship competition.
 1998 Elbert C. Cole award for outstanding performance in the Department of Biology, Middlebury College.

PROFESSIONAL SERVICE

- 2007 → Development and deployment of programs for charcoal analysis and chronology development for sediment records.
 2006 → Secretary, Paleoecology Section of the Ecological Society of America
 2005 Co-organized and led workshop for 20 participants on reconstructing fire regimes with sediment charcoal records at the Ecological Society of America meeting.
 2000 → Peer reviewer for the *Canadian Journal of Forest Research*, *Ecology*, *Ecosystems*, *Journal of Vegetation Science*, *The Holocene*, and the National Science Foundation.

PUBLIC SERVICE

- 2006, 2007 Instructor, North Cascades Institute, Diablo, Washington. Designed and co-taught two-day forest ecology course for adults.

PROFESSIONAL ASSOCIATIONS

- 2007 → American Association of Geographers
 2006 → American Geophysical Union
 2004 → Union of Concerned Scientists
 2004 → International Association for Landscape Ecology, U.S. Regional Association
 2000 → Ecological Society of America, Paleoecology Section member

INVITED SEMINARS

- May 2008 Department of Geography, University of Wisconsin
 May 2007 Department of Geography, University of Oregon.
 Jan. 2007 Department of Ecology, Montana State University
 Dec. 2006 Department of Earth Sciences, Montana State University

REFEREED MANUSCRIPTS, PUBLISHED AND IN REVIEW

Higuera, P. E., L. B. Brubaker, P. M. Anderson, F. S. Hu, and T. A. Brown. Vegetation-mediated the impacts of climate change on late glacial and Holocene fire regimes in the southcentral Brooks Range, Alaska. In review at *Ecology*.

Higuera, P. E., L. B. Brubaker, P. M. Anderson, T. A. Brown, A. T. Kennedy, and F. S. Hu. in press. Frequent fires in ancient shrub tundra: implications of paleo-records for Arctic environmental change. *PLoS ONE*, in press.

Sugimura, W., D. G. Sprugel, L. B. Brubaker, and P. E. Higuera. in press. 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*, in press

Power, M. J., J. Marlon, N. Ortiz, P. J. Bartlein, S. P. Harrison, F. E. Mayle, A. Ballouche, R. Bradshaw, C. Carcaillet, C. Cordova, S. Mooney, P. Moreno, I. C. Prentice, K. Thonicke, W. Tinner, C. Whitlock, Y. Zhang, Y. Zhao, R. S. Anderson, R. Beer, H. Behling, C. Briles, K. J. Brown, B. A., M. Bush, P. Camill, G. Q. Chu, J. Clark, D. Colombaroli, S. Connor, M. Daniels, A. Daniau, J. Dodson, E. Doughty, M. E. Edwards, W. Fisinger, D. Foster, F. J., M. Gaillard, G. Gil-Romera, D. G. Gavin, E. Gobet, S. Haberle, D. J. Hallett, P. Higuera, G. Hope, S. Horn, S. Impagliazzo, J. Inoue, P. Kaltenrieder, L. Kennedy, Z. C. Kong, C. Larsen, C. J. Long, J. Lynch, B. Lynch, M. McGlone, S. Meeks, S. Mensing, G. Meyer, T. Minckley, J. Mohr, D. Nelson, J. New, R. Newnham, R. Noti, W. Oswald, J. Pierce, P. J. H. Richard, C. Rowe, M. F. Sanchez Goñi, B. J. Shuman, H. Takahara, J. Toney, C. Turney, C. Umbanhowe, M. Vandergoes, B. Vanniere, E. Vescovi, M. Walsh, X. Wang, N. Williams, J. Wilmshurst, and J. H. Zhang. Changes in fire regimes since the Last Glacial Maximum: an assessment based on a global synthesis and analysis of charcoal data. *Climate Dynamics*, in press

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.

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.

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.

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.

Trombulak, S. C., **P. E. Higuera**, and M. DesMeules. 2001. Population trends of wintering bats in Vermont. *Northeastern Naturalist* 8:51-62.

SELECTED PUBLISHED ABSTRACTS FROM ORAL OR POSTER PRESENTATIONS

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. **93rd Annual Meeting of the Ecological Society of America**, San Jose, California. (poster)

Higuera, P.E., L.B. Brubaker, P.M. Anderson, F.S. Hu, and T.A. Brown. 2006. Vegetation-Mediated Impacts of Climatic Change on Late Glacial and Holocene Fire Regimes in the Southcentral Brooks Range, Alaska. Conference Proceedings from the annual fall meeting of the **American Geophysical Union**, San Francisco, CA. (poster)

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. page 100 *in* Conference Proceedings from **90th Annual Meeting of the Ecological Society of America**, Montreal, Quebec. (talk)

Higuera, P.E., D.G. Gavin, M.E. Peters. 2004. When does a charcoal peak represent a fire? Insights from a simple statistical model. Page 220 *in* Abstracts of the **89th Annual Meeting of the Ecological Society of America, Portland, Oregon**. (talk)

Higuera, P.E., L.B. Brubaker, P.M. Anderson, F.S. Hu, B. Clegg, T. Brown, S. Rupp. 2004. Paleo Investigations of Climate and Ecosystem Archives (PICEA): Holocene climate-vegetation-fire interactions in the southern Brooks Range, Alaska. Page 161 *in* Abstracts of the **Bjerknes Centenary: Climate Change in High Latitudes, Bergen, Norway**. (poster)

Higuera, P.E., L.B. Brubaker, P.M. Anderson, F.S. Hu, B. Clegg, T. Brown, S. Rupp. 2004. Paleo Investigations of Climate and Ecosystem Archives (PICEA): Holocene climate-vegetation-fire interactions in the southern Brooks Range, Alaska. Page 87 *in* Abstracts of the **12th Annual Science Meeting of the International Boreal Forest Research Association, Fairbanks, Alaska**. (poster)

Higuera, P.E., M.E. Peters, D.G. Gavin. 2004. Holocene fire-history records from lake sediments: improving accuracy and precision through quantitative modeling. Page 96 *in* Abstracts of the **19th Annual Symposium of the International Association for Landscape Ecology, US Regional Association, Las Vegas, Nevada**. Invited presentation for Special Session: "Scaling laws in fire regimes: moving landscape fire history into the 21st century" (talk)

Higuera, P.E., L.B. Brubaker, P.M. Anderson, F.S. Hu, B. Clegg, T. Brown, S. Rupp. 2004. Holocene vegetation, fire, and climate history from the southern Brooks Range, Alaska. Page 73 *in* Abstracts of the **34th International Arctic Workshop, Institute of Arctic and Alpine Research, Boulder, Colorado**. (talk)

Higuera, P.E., L.B. Brubaker, D.G. Sprugel. 2002. Reconstructing fire regimes with small hollows: A calibration with tree-ring records. *in* Abstracts of the **87th Annual Meeting of the Ecological Society of America, Tucson, Arizona**. (talk)