

## ERNESTO ALVARADO

Research Associate Professor

School of Environmental and Forest Sciences, University of Washington  
Seattle, WA

### Area of Expertise

Wildland Fire Science, Combustion and Fire Behavior, Fire Ecology, Smoke and Carbon Emissions from Biomass Burning, Tropical Forestry, Landscape and Disturbance Ecology, Fire Management, Fire Policy, International Forestry, Traditional Ecological Knowledge.

### Professional Preparation

1992. Ph. D. Wildland Fire Sciences and Quantitative Resource Management. University of Washington.

Dissertation: Large forest fires: An analysis using extreme value theory and robust statistics approaches

1986. MS. Silviculture and Forest Management. Postgraduate College, Chapingo, Mexico.

Thesis: Forest fire behavior in undisturbed stands of *Pinus montezumae* Lamb.

1980. B.S. Agronomy, Minor in Plant Protection. Universidad Autonoma Chapingo, Chapingo, Mexico.

Thesis: Health diagnostics of wind-blown and snow-damaged trees in the Forest Management Unit No. 2 PROFORMEX, Durango, Mexico

### Appointments

7/09–Present Research Associate Professor, School of Environmental and Forest Sciences, University of Washington.

9/15-6/16 Interim Director of the Center for Sustainable Forestry at Pack Forest, UW.

4/93–Present Affiliate Scientist, USDA Forest Service, PNW Research Station, Pacific Wildland Fire Sciences Laboratory, Seattle, WA

7/93- 6/09 Sr. Research Scientist and Lecturer. College of Forest Resources, University of Washington.

7/99-9/99 Visiting Scientist, Combustion and Propulsion Laboratory of Brazil's National Institute for Space Research (INPE), University of the State of Sao Paulo (UNESP), Brazil, and University of Aveiro, Portugal.

### Publications (Most closely related to project)

1. Vega-Nieva D.J., Briseño-Reyes J., Nava-Miranda M.G., Calleros-Flores E., López-Serrano P.M., Corral-Rivas, J.J., Montiel-Antuna E., Cruz M.I., Cuahutle, M., Ressler R., Alvarado-Celestino E., González-Cabán A., Jiménez E., Álvarez-González J.G., Ruiz-González A.D., Burgan R.E., Preisler H.K. 2018. Developing models to predict the number of fire hotspots from an accumulated fuel dryness index by vegetation type and region in Mexico. *Forests* 2018, 9, 190; doi:10.3390/f9040190
2. Guenther CKF, P Bufacchi, JC Santos, **E Alvarado**, JA de Carvalho Jr. 2017. Probability of surface fire spread in Brazilian rainforest fuels from outdoor experimental measurements. *European Journal of Forest Research* DOI 10.1007/s10342-016-1023-2.
3. Urgenson, L; Nelson, CR.; Haugo, RD; Halpern, CB; Bakker, JD; Ryan, CM; Waltz, AM; Belote, TR; **Alvarado, E**. 2017. Social perspectives on the use of reference conditions in restoration of fire-adapted forest landscapes. *Journal Restoration Ecology*. DOI: 10.1111/rec.12640
4. Xiaoman, L, G Zheng, C Miller, **E Alvarado**. 2017. Combining multi-source remotely sensed data and a process-based model for forest aboveground biomass updating. *Sensors* 2017, 17, 2062;

5. Paulo Bufacchi, Guenther Carlos Krieger Filho, William Mell, **Ernesto Alvarado**, José Carlos Santos, and Joao Andrade Carvalho Jr. 2016. Numerical simulation and experiments of surface forest fire in Amazonia. *Fire Safety Journal* 79: 44-56
6. **Alvarado, E.** 2015. Book Review Current International Perspectives on Wildland Fires, Mankind and the Environment. 2015. Edited by Brigitte Leblon and Martin E. Alexander. Nova Science Publishers Inc., Hauppauge, New York, USA. 271 pp. Book Review in *Fire Ecology* Volume 11, Issue 3, 2015. doi: 10.4996/fireecology.1103149.
7. French, N.H.F.; de Groot, W.J.; Jenkins, L.K.; Rogers, B.M.; **Alvarado, E.**; Amiro, B.; de Jong, B.; Goetz, S.; Hoy, E.; Hyer, E.; Keane, R.; McKenzie, D.; McNulty, S.G.; Law, B.E.; Ottmar, R.; Pérez-Salicrup, D.R.; Randerson, J.; Robertson, R.K.; Turetsky, R. 2011. Carbon emissions from North American wildland fires: A comparison of modeling approaches. *Journal of Geophysical Research*. VOL. 116, G00K05, doi:10.1029/2010JG001469, 2011
8. Van Leeuwen, T.T., Van der Werf, G.R., Hoffmann, A.A., Detmers, R.G., R<sup>v</sup>cker, G., French, N.H., Alvarado, E., Hély, C. (2014). Biomass burning fuel consumption rates: a field measurement database. *Biogeosciences* 11:8115-8180. doi:10.5194/bgd-11-8115-2014.
9. Carvalho Jr, J. A.; C. A. G. Veras, **E. C. Alvarado**, D. V. Sandberg, R. Gielow, E. R. Carvalho, and J. C. Santos. 2010. Understorey fire propagation and tree mortality on adjacent areas to an Amazonian deforestation fire. *International Journal of Wildland Fire* 19: 795-799.
10. Avalos, C. D., D. L. Peterson, **Alvarado, E.**, and Ferguson, S. A. and Besag, J. E. 2001. Space-time modeling of lightning-caused forest fires in the Blue Mountains, Oregon. *Can. J. For. Res.* 31(9): 1579-1593.
11. Hessburg, P. F., B.G. Smith, R.B. Salter, R.D. Ottmar, **E. Alvarado**. 2000. Recent changes (1930s-1990s) in spatial patterns of interior northwest forests, USA. *For. Ecol. Management* 136 (1-3): 53-83
12. **Alvarado, E.**, D. V. Sandberg, and S. G. Pickford. 1998. Modeling large forest fires as extreme events. *Northwest Science* 72:66-75.

### Additional Publications

1. Mason, L.; White, G.; Morishima, G.; **Alvarado**, and 22 Other Tribal Elders and Managers. 2012. Listening and Learning from Traditional Knowledge and Western Science: A Dialogue on Contemporary Challenges of Forest Health and Wildfire. *Journal of Forestry* June 2012: 187-193.
2. Cassell, B.A.; **Alvarado, E.** 2012. Reconstruction of fire history in Mexican tropical pines using tree rings. *The Forestry Chronicle* 88(5): 553-555
3. **Alvarado, E.**; de Carvalho Jr., J.A. 2011. Fire in the Amazon Forest. In.; Amorim, J.; Keizer, J.J.; Miranda, A.; Monaghan, K. (Editors) *Forest fires research - Beyond burnt area statistics*. Published by the University of Aveiro. Center for Environmental and Marine Studies. Aveiro, Portugal. ISBN 978-972-789-345-4. Book Chapter 4. Pages 13-18.
4. **Alvarado, E.**; D. V. Sandberg; J. A. de Carvalho Jr.; R. Gielow; J. C. Santos. 2004. Landscape fragmentation and fire vulnerability in primary forest adjacent to recent land clearings in the Amazon arc of deforestation. *Floresta* 34(2) 169-174.
5. Heyerdahl, Emily; **Alvarado, E.** 2003 . The Influence of Climate and Land Use on Historical Surface Fires in Pine-Oak Forests, Sierra Madre Occidental, Mexico. In. Veblen, T. T.; Montenegro, G.; Swetnam, T. W. (Eds.) *Fire and Climatic Change in Temperate Ecosystems of the Western Americas*. Series: Ecological Studies. Volume. 160. Springer.

### Synergistic Activities

My research on wildland fires spans from Alaska, the Pacific Northwest to Florida, Brazil and Mexico. I have an extensive national and international network of scientific cooperators, which has allowed me to establish a successful research and teaching program at the University of Washington. I have an extensive research experience on topics related to landscape restoration on fire prone forests, deforestation burning, biomass combustion, smoke emissions, post-fire recovery biomass recovery, and fire management, and traditional ecological knowledge. I am frequently invited by the Mexican and Brazilian Forest Service, and Bolivia's *FAN* to give talks and participate in advisory panels on fire management.

Frequent reviewer for *International Journal of Wildland Fire, Ecological Applications, Journal of Theoretical Biology, Canadian Journal of Forest Sciences, Journal of Geophysical Research, Atmospheric Chemistry and Physics, Agrociencia, Fuel, Biogeosciences, Fire Ecology, European Journal of Forest Research, Environmental Research Letters.*

Participant in Proposal Selection Panels: *DOD Strategic Environmental Research and Development Program, Joint Fire Sciences Program, NSF, Mexico's National Council of Science and Technology, Environmental Protection Agency, British Columbia Natural Resources and Applied Sciences Endowment.*

Outreach to the Forest and Fire Management Community: *Member of the Research Subcommittee of the Intertribal Timber Council, Lecturer on fire behavior, fuel management, smoke emissions in the United States, Mexico, Brazil, Bolivia, and Paraguay.*

Support of USFS International Programs and USAID on *fire management and climate change activities in Brazil, Mexico, Bolivia, and Paraguay.*

Affiliated to the Pacific Wildland Fire Sciences Laboratory of the USFS PNW Research Station since 1992. Conducts joint research throughout the USA from Alaska, Pacific Northwest, Florida, and the SW.

### **Collaborators and Other Affiliations (Past 5 years)**

1. Thesis Advisors: Stewart Pickford, David Sandberg, Bruce Bare, Frank Greulich, Robert Gara

Collaborators: Morgan Varner, Sim Larkin, David Peterson, Roger Ottmar, Colin Hardy, William Mell (USFS), Robert Yokelson (University of Montana), Joao Andrade de Carvalho (UNESP Brazil), Carlos Gurgel Veras (University of Brasilia), Fernando Costa and Turibio Soares Neto (Brazil' INPE), Marcus Vinicio de Oliveira (Brazil's EMBRAPA State of Acre), Diego Perez-Salicrup (Mexico's UNAM), Enrique Jardel (Mexico's UdeG), Thomas Hinckley, James Agee, Thomas DeLuca, Indroneil Gangully, Jonathan Bakker (UW Forestry), Robert Freitag (UW Built Environments).

2. Current Students and Visiting Scientists:

James Cronan (PhD), Paulina Casillas (Ph.D), Colton Miller (PhD), Fabiola Pulido Chavez (MS), Lesly Franco (MS), Harry Podschwit (PhD), Samantha de Abreu (PhD), Claudia Munoz (MS), Lawrence Curley (MS), Anthony Martinez (Undergrad), Wyatt O'Brien (Undergrad), Paul Albertini (Undergrad), Dana Chapman (Undergrad), Ronan Paugam (France).

3. Former Graduate Students, Postdocs, and Visiting Scientists and Current Employers

Ashley Blazina (UW), Tmthspusmen Wilder (MS, Colville Tribe), Pratibha Duwal (MS, Yakama Tribe), Brooke Cassell (PhD at PSU), Katherine Wyatt (MS, Stanford U), Natasha Stavros (NASA JPL), Gustavo Hess de Negreiros (PhD - Brazil), Carlos Diaz Avalos (PhD Mexico's UNAM),

Carlos Gurgel Veras (Postdoc, University of Brasilia), Joseph Restaino (UW), Lourdes Villers-Ruiz (Postdoc, Mexico's UNAM), Marcus Vinicio de Oliveira (Brazil's EMBRAPA), Diego Perez Salicrup (Mexico's UNAM), Joao Andrade de Carvalho (Brazil's UNESP), Guenther Krieger (Brazil's USP).