

Jane R. Foster

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RESEARCH INTERESTS

Forest and landscape ecology, geospatial quantitative methods to exploit image and GIS data, landscape simulation models, hierarchical Bayesian modeling of complex natural systems, tree physiology and community response to disturbance and climate change.

EDUCATION

- 2011 PhD, Forestry
University of Wisconsin Madison, WI
Dissertation: *Forest insect defoliation patterns and carbon dynamics: linking remote sensing with simulation modeling* (Advisor: Dr. David Mladenoff)
- 2000 MS, Forest Science
Yale School of Forestry and Environmental Studies New Haven, CT
Thesis: *Spatial and temporal patterns of beaver pond establishment in a New England forest* (Advisor: Dr. David Skelly)
- 1996 BA, Biology
Yale University New Haven, CT

PROFESSIONAL APPOINTMENTS

- 2013-present, Postdoctoral Fellow, Northeast Climate Science Center, University of Minnesota
- 2011-2013, Postdoctoral Associate, University of Minnesota, Mentor: Dr. Anthony D'Amato
- 2005-2011, Research Assistant, University of Wisconsin-Madison, Advisor: Dr. David Mladenoff
- 2000-2005, Remote Sensing Analyst, University of Maryland Center for Environmental Science, Appalachian Laboratory, Dr. Philip Townsend
- 1999, 2000, Teaching Fellow, "Observing the Earth from Space," Yale University
- 1999-2000, GIS Coordinator, Yale School Forests
- 1996-1998, Remote Sensing Research Assistant, Yale Center for Earth Observation
- 1995-1996, Collections Assistant, Yale Peabody Museum of Natural History

FELLOWSHIPS AND AWARDS

NASA Earth System Science Fellowship, 2008-2011, \$90,000

CALS Wisconsin Distinguished Graduate Fellowships, 2008, *Declined*

Forestry Award, Yale School of Forestry and Environmental Science, 1998-2000, \$14,000

USDA-NIFA Professional Enhancement Award, 2010, \$500

NAFEW Best Student Presentation – Disturbance Interactions, 2009, \$500

NASA-MSU Professional Enhancement Award, 2007, \$500

PUBLICATIONS

In press

- [12] **Foster, J.R.** and A.W. D'Amato. *In press*. Montane forest ecotones moved downslope in northeastern US in spite of warming between 1984 and 2011. *Global Change Biology*.

Published

- [11] **Foster, J.R.**, D'Amato, A.W. and J.B. Bradford. 2014. Looking for age-related growth decline in natural forests: unexpected biomass patterns from tree rings and simulated mortality. *Oecologia* 175:363-374.
- [10] de Bruijn, A., Gustafson, E., Sturtevant, B.R., **Foster, J.R.**, Miranda, B.R., Lichti, N.I. and D.F. Jacobs. 2014. Toward more robust projections of forest landscape dynamics under novel environmental conditions: Embedding PnET within LANDIS-II. *Ecological Modelling* 287:44-57.
- [9] **Foster, J.R.**, Townsend, P.A. and D.J. Mladenoff. 2013. Mapping asynchrony between gypsy moth egg-hatch and forest leaf-out: putting the phenological window hypothesis in a spatial context. *Forest Ecology and Management* 287:67-76.
- [8] **Foster, J.R.**, Townsend, P.A., and D.J. Mladenoff. 2013. Spatial dynamics of a gypsy moth defoliation outbreak and dependence on habitat characteristics. *Landscape Ecology* 28:1307-1320.
- [7] **Foster, J.R.**, Burton, J.I., Forrester, J.A., Liu, F., Muss, J.D., Sabatini, F.M., Scheller, R.M., and D.J. Mladenoff. 2010. Evidence for a recent increase in forest growth is questionable. *Proceedings of the National Academy of Sciences* 107:E86-E87.
- [6] Townsend, P.A., Singh A., **Foster, J.R.**, Rehberg, N.J., Kingdon, C.C., Eshleman, K.N. and S.W. Seagle. 2012. A general Landsat model to predict canopy defoliation in broadleaf deciduous forests. *Remote Sensing of Environment* 119:255-265.
- [5] **Foster, J.R.**, Townsend, P.A. and C.E. Zganjar. 2008. Spatial and temporal patterns of gap dominance by low-canopy lianas detected using EO-1 Hyperion and Landsat Thematic Mapper. *Remote Sensing of Environment* 112:2104-2117.

- [4] McNeil, B.E., deBeurs, K.M., Eshelman, K.N., **Foster, J.R.**, and P.A. Townsend. 2007. Maintenance of ecosystem nitrogen limitation by ephemeral forest disturbance: An assessment using MODIS, Hyperion, and Landsat ETM. *Geophysical Research Letters* 34 (19):L19406.
- [3] **Foster, J.R.** and P.A. Townsend. 2004. Linking hyperspectral imagery and forest inventories for forest assessment in the central Appalachians. Proceedings, 14th Central Hardwoods Forest Conference 2004 March 16-19; Wooster, OH. Gen. Tech. Rep. NE-316. Newtown Square, PA: U.S. Department of Agriculture. Forest Service. Northeastern Research Station.
- [2] Townsend, P.A., **Foster, J.R.**, Chastain, R.A., Jr. and W.S. Currie. 2003. Application of imaging spectroscopy to mapping canopy nitrogen in the forests of the central Appalachian mountains using Hyperion and AVIRIS. *IEEE Transactions on Geoscience and Remote Sensing* 41:1347-1354.
- [1] Townsend, P.A. and **J.R. Foster**. 2002. A synthetic aperture radar-based model to assess historical changes in lowland floodplain hydroperiod. *Water Resources Research* 38(7):1115.

In review

Itter, M.S., Finley, A.O., D'Amato, A.W., **Foster, J.R.**, and J.B. Bradford. *In review*. Development and application of a dynamic hierarchical model to assess the effects of climate on tree growth. *Biometrics*.

In preparation (fully drafted only)

Foster, J.R., Scheller, R.M., Sturtevant, B.R. and D.J. Mladenoff. *In revision following review*. Forest insect defoliation and carbon dynamics: simulating multiple defoliators in temperate landscapes with Landis-II. *Ecological Applications*.

Foster, J.R. *In prep*. Tree functional group predicts growth and mortality response to cumulative defoliation stress in temperate forests. *Tree Physiology*.

Foster, J.R., Finley, A.O., Bradford, J.B., and A.W. D'Amato. *In prep*. Predicting future tree growth: is tree size, age, competition or climate variation most important? *Global Change Biology*.

Proceedings and technical reports

Young, J., Fleming, G., Townsend, P.A., and **J.R. Foster**. 2006. Vegetation of Shenandoah National Park in Relation to Environmental Gradients: Final Report (v1.1). USGS-NPS Vegetation Mapping Program, US Department of Interior National Park Service.

Foster, J.R., C.C. Kingdon and P.A. Townsend. 2002. Predicting tropical forest carbon from EO-1 hyperspectral imagery in Noel Kempff Mercado National Park, Bolivia. In Proceedings of the 2002 International Geoscience and Remote Sensing Symposium.

Townsend, P.A. and **J.R. Foster**. 2002. Comparison of EO-1 Hyperion to AVIRIS for mapping forest composition in the Appalachian Mountains, USA. In Proceedings of the 2002 International Geoscience and Remote Sensing Symposium.

Foster, J.R. and P.A. Townsend. 2002. Mapping forest composition in the Central Appalachians using AVIRIS: Effects of topography and phenology. In Proceedings of the 11th JPL Airborne Earth Science Workshop, R.O. Green, Ed. Pasadena, CA, 2002.

Townsend, P.A. and **J.R. Foster**. 2002. Terrain normalization of AVIRIS and Hyperion imagery in forested landscapes. In Proceedings of the 11th JPL Airborne Earth Science Workshop, R.O. Green, Ed. Pasadena, CA, 2002.

Smith, R.B., **Foster, J.R.**, Kouchoukos, N., Gluhosky, P.A., Young, R., J. Zhang and E. Depauw 2000. Hydrologic trends in the Middle East: Modeling and Remote Sensing. ICARDA, Aleppo, Syria.

Kouchoukos, N., Smith, R.B., Gleason, A., Thenkabail, P., Hole, F., Barkoudah, Y., Albert, J., Gluhosky, P. and **J. Foster**. 1998. Monitoring the distribution, use, and regeneration of natural resources in semi-arid Southwest Asia. In: Transformations of Middle Eastern Natural Environments: Legacies and Lessons. Albert, J., Bernhardsson, M. and R. Kenna, Editors. Bulletin Series Yale School of Forestry and Environmental Studies 103.

TEACHING

2015 Guest Lecturer, Landscape Ecology, University of Wisconsin-Madison.

2012 Guest Lecturer, Silviculture, University of Minnesota.

2011 Guest Lecturer, Landscape Ecology, University of Wisconsin-Madison

2009 Guest Lecturer, Landscape Ecology, University of Wisconsin-Madison

2000 Teaching Fellow, Observing the Earth from Space, Yale University.

1999 Teaching Fellow, Observing the Earth from Space, Yale University.

1999 Teaching Assistant, Ecosystem Measurement Field Course (3 week-long sessions), Yale School of Forestry and Environmental Studies.

2011 Education Chair, 2008-2010 Instructor, Hooper Sailing Club, University of Wisconsin-Madison.

PRESENTATIONS

Invited

2015 **Foster, J.R.**, D'Amato, A.W., and J. Bradford. Simulation of insect impacts on forest dynamics: Landsat defoliation maps predict growth declines in tree ring data. Presented at 9th the International Association of Landscape Ecology (IALE) World Congress, July 5-10 2015, Portland, OR.

2012 **Foster, J.R.**, Scheller R.M. and D.J. Mladenoff. Effects of insect defoliation and forest management on aboveground carbon. Presented at the 27th annual meeting of U.S. Regional

Association of the International Association of Landscape Ecology (IALE), April 8-12 2012, Newport, RI.

Contributed

- 2013 **Foster, J.R.**, D'Amato, A.W. and J. Bradford. Sensitivity of tree species and forest types to past weather variability using dendrochronological techniques. Presented at 98th Annual Meeting of the Ecological Society of America (ESA), August 4-9 2013, Minneapolis, MN.
- 2013 **Foster, J.R.**, D'Amato, A.W. and J. Bradford. Sensitivity of tree species and forest types to moisture stress from tree ring reconstructions of biomass growth. Presented at the Next Generation Climate Data Products Workshop, July 15-19, National Center for Atmospheric Research, Boulder, CO.
- 2013 **Foster, J.R.**, D'Amato, A.W. and J. Bradford. Sensitivity of tree species and forest types to weather variability from tree ring reconstructions of biomass growth. Presented at the 9th North American Forest Ecology Workshop, June 16-20, Bloomington, IN.
- 2012 **Foster, J.R.**, D'Amato, A.W. and J. Bradford. Biomass increment patterns derived from tree rings on the Superior National Forest. . Presented at 97th Annual Meeting of the Ecological Society of America (ESA), August 5-10 2012, Portland, OR.
- 2012 **Foster, J.R.**, Scheller, R., Townsend, P., Sturtevant, B. and D.J. Mladenoff. Forest insect defoliation and carbon dynamics: linking remote sensing with simulation modeling. Presented at Landis-II Workshop, January 13 2012, Madison, WI.
- 2010 **Foster, J.R.**, Scheller R.M. and D.J. Mladenoff. Simulation of defoliation outbreaks in deciduous landscapes: How disturbance interactions affect forest carbon sequestration. Presented at 95th Annual Meeting of the Ecological Society of America (ESA), August 1-6 2010, Pittsburgh, PA.
- 2010 **Foster, J.R.**, Scheller R.M. and D.J. Mladenoff. Forest insect defoliation and carbon dynamics: Simulating multiple defoliators with Landis-II. Presented at Wisconsin Ecology Spring Symposium, April 15-16 2010, Madison, WI.
- 2010 **Foster, J.R.**, Scheller R.M. and D.J. Mladenoff. Forest insect defoliation and carbon dynamics: Simulating multiple defoliators with Landis-II. Presented at the 25th annual meeting of U.S. Regional Association of the International Association of Landscape Ecology (IALE), April 5-9 2010, Athens, GA.
- 2010 **Foster, J.R.**, Scheller R.M. and D.J. Mladenoff. Simulating forest insect defoliation and carbon dynamics with Landis-II. Presented at Landis-II Workshop, January 11-13 2010, Madison, WI.
- 2009 **Foster J.R.**, Scheller R.M. and D.J. Mladenoff. Forest insect defoliation and carbon dynamics: simulating multiple defoliator species in shared landscapes with Landis-II. Presented at 7th Annual North American Forest Ecology Workshop, June 22-26 2009, Logan, UT.
- 2008 **Foster J.R.** and D.J. Mladenoff. A review and synthesis of multispecies growth suppression and mortality responses to forest canopy defoliator outbreaks. Presented at 93rd Annual Meeting of the Ecological Society of America (ESA), August 3-8 2008. Milwaukee, WI.
- 2007 **Foster, J.R.**, Scheller R., Townsend P.A., and D.J. Mladenoff. Geostatistical analysis of satellite mapped defoliation intensity: Integrating results and modeling defoliation effects on above-

ground biomass. Presented at the annual meeting of U.S. Regional Association of the International Association of Landscape Ecology (IALE). April 9-13 2007. Tucson, AZ.

2006 **Foster, J.R.**, Mladenoff D.J. and R.M. Scheller. Modeling insect defoliation outbreaks and their effects on carbon dynamics of forested landscapes. Landis II Developer's Workshop. Madison, Wisconsin.

CONFERENCES

9th IALE World Congress, July 5-10 2015. Portland, OR.
American Geophysical Union (AGU) Fall Meeting 2014. San Francisco, CA.
98th Annual Meeting of the Ecological Society of America (ESA) August 2013. Minneapolis, MN.
9th North American Forest Ecology Workshop (NAFEW) June 2013. Bloomington, IN.
97th Annual Meeting of the Ecological Society of America (ESA) August 2012. Portland, OR.
95th Annual Meeting of the Ecological Society of America (ESA) August 2010. Pittsburgh, PA.
27th International Association Landscape Ecology Symposium (IALE) April 2012. Newport, RI.
25th International Association Landscape Ecology Symposium (IALE) April 2010. Athens, GA.
7th North American Forest Ecology Workshop (NAFEW). June 2009. Logan, UT.
93rd Ecological Society of America (ESA) Annual Meeting. August 2008. Milwaukee, WI.
23rd International Association Landscape Ecology Symposium (IALE) April 2008. Madison, WI.
22nd International Association Landscape Ecology Symposium (IALE) April 2007. Tucson, AZ.
14th Central Hardwoods Forest Conference. March 2004. Wooster, OH.
11th AVIRIS Earth Sciences and Applications Workshop. March 2002. Pasadena, CA.
NASA EO-1 Science Validation Team Meeting. November 2002. Hilo, HI.
NASA EO-1 Science Validation Team Meeting. April 2002. Greenbelt, MD.
NASA EO-1 Science Validation Team Meeting. May 2001. Tucson, AZ.

SPECIAL TRAINING AND WORKSHOPS

Next Generation Climate Data Products Workshop, 2013, NCAR, Boulder, CO.
A Brief Introduction to Bayesian and Hierarchical Bayesian Modeling in Ecology, 2013, ESA
Minneapolis, MN.
7th North American Dendroecological Fieldweek, 2007, Great Smoky Mountains NP, TN.
3rd Landis-II Workshop, January 11-13 2010, Madison, WI.
2nd Landis-II Workshop, October 2007, Woodruff, WI.
1st Landis-II Developer's Workshop, October 2006, Madison, WI.
Introduction to IDL (IDL 100 – 3 days). 2001. Herndon, VA.

SKILLS

Statistical programming expertise in R, SAS, Stan, and IDL. Official coursework: Statistical Methods for Biosciences I and II, Spatial Statistics, Multivariate Analysis in Landscape/Community Ecology, Sampling Methodology and Practice.

GIS and Image processing/programming expertise using ENVI, IDL, ArcGIS, ArcInfo, ERDAS Imagine, ERMapper.

Ecological Modeling and programming experience with LANDIS-II (in C#), PnET-II.

Bayesian modeling experience with rStan.

PROFESSIONAL AFFILIATIONS

American Geophysical Union

Ecological Society of America

International Association of Landscape Ecologists – U.S. Chapter

SERVICE

Graduate Student Departmental Representative, 2007-2010

Journal referee

Ecological Applications 2015

Ecosphere 2015

Environmental Modelling & Software 2015

Ecology 2014

Landscape Ecology 2014

Oecologia 2013

Ecological Monographs 2013

Canadian Journal of Forest Research 2012

Remote Sensing of Environment, 2006, 2007, 2010

Forest Ecology and Management, 2005

IEEE Transactions on Geoscience and Remote Sensing, 2003