

JENNIFER A. HOLM

Research Scientist

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Education and Training

Emory University, Atlanta, GA, B.S. Environmental Studies, 2004

Major: Environmental Studies, Minor: Anthropology

University of Florida, Gainesville, FL, M.S. Interdisciplinary Ecology, 2007

Major: Interdisciplinary Ecology, Tropical Conservation and Development Certificate

University of Virginia, Charlottesville, VA, Ph.D. Environmental Sciences, 2012

Major: Environmental Sciences

Research and Professional Experience

2016 - Present Research Scientist

LBNL, Berkeley, CA. Accelerated Climate Modeling for Energy (ACME, DOE Funded): dynamic vegetation modeler.

2012 - 2016 Geologic Postdoctoral Fellow

LBNL, Berkeley, CA. My main area of expertise is understanding how forested ecosystems are responding and will be affected by a changing climate, and natural and anthropogenic driven disturbances. I have experience in terrestrial ecosystem modeling and tropical forest fieldwork activities, all towards understanding the uncertainties surrounding vegetation and carbon response associated with climate change. My research interests include topics on consequences of terrestrial disturbance on the carbon cycle, model testing, parameterization, and adaptive management strategies for managing the impacts of climate variability. I have experience in evaluating model uncertainty in the Community Land Model (CLM) and the Community Earth System Model (CESM) a global climate model.

Past Projects: GoAmazon (DOE Funded): modeling tropical tree mortality response to altered precipitation patterns; Accelerated Climate Modeling for Energy (ACME, DOE Funded): dynamic vegetation modeler; integrated Earth System Model (iESM, coupling the energy market sector and GHG emissions to a global Earth System Model).

Current Projects: Next Generation Ecosystem Experiment for the Tropics (NGEE-Tropics, DOE Funded): dynamic vegetation modeler, improving ecosystem demography representation in the NGEE-T model and response to natural disturbances and human driven land-use change.

Mar. – Jun. 2012 Visiting Scientist/Postdoctoral Fellow

Smithsonian Conservation Biology Institute, Front Royal, VA. Forest modeling and impacts of deer browsing and canopy gap disturbances on forest succession.

Jan. – Feb. Field Researcher

- 2010** *Guanica, Puerto Rico*. Hyperspectral NASA experiment. Conducted terrestrial ground-truthing for a large hyperspectral imagery classification project.
- 2008 - 2012** **Graduate Research Assistant (RA)**
University of Virginia. Assessing the ecological impacts of hurricane damage on the seasonal dry sub-tropical forests in Sian Kaan Reserve and Calakmul Biosphere Reserve, Southern Yucatan, Mexico.
- Sept. – Dec. 2007** **Field Research Technician**
Luquillo Experimental Forest, El Verde Field Station, Puerto Rico. Data collection and data synthesis for the on-going Long-Term Ecological Research (LTER) Project, which looks at the impact and response to hurricane disturbance on tropical forested ecosystems.
- 2005 - 2007** **Graduate Teaching Assistant & Field Researcher**
University of Florida. Field research in the Amazon Basin (Lowlands), Loreto, Peru.

Publications

- Holm, J.A.**, Ryan G. Knox, C. D. Koven, M. Longo, W. J. Riley, J. Q. Chambers, R. I. Negrón-Juarez, Niro Higuchi, P. R. Moorcroft, A. Manzi. Amazon forest carbon sink and carbon cycling dynamics under rising atmospheric carbon dioxide, *Global Change Biology*, Submitted.
- Negrón-Juárez, R.I., **J. A. Holm**, D. Magnabosco Marra, S. W. Rifai, W. J. Riley, J. Q. Chambers, C. D. Koven, R. G. Knox, M. E. McGroddy, A. V. Di Vittorio, J. Urquiza-Muñoz, R. Tello-Espinoza, W. Alegria-Muñoz, G. H. P. M. Ribeiro, N. Higuchi. Vulnerability of Amazon forests to storm-driven tree mortality. *Science Advances*. In revision.
- Holm, J.A.**, L.M. Kueppers, J.Q. Chambers. Novel tropical forests: Response to global change. *New Phytologists*, 213, 988-992, 2017.
- Holm, J.A.**, S. J. Van Bloem, H. H. Shugart, and G. R. Larocque. Shifts in biomass and productivity for a subtropical dry forest in response to simulated elevated hurricane disturbances. *Environmental Research Letters*, doi:10.1088/1748-9326/aa583c, 2017.
- Jardine, K.J., A. B. Jardine, **J. A. Holm**, D. L. Lombardozzi, R. I. Negrón-Juarez, S. T. Martin, H. R. Beller, B. O. Gimenez, L. R. Piva, J.Q. Chambers, and N. Higuchi. Monoterpene ‘thermometer’ of tropical forest-atmosphere response to climate warming. *Plant Cell and Environment*, doi: 10.1111/pce.12879, 2017.
- Fisher, R. A., S. Muszala, M. Vertenstein, P. Lawrence, C. Xu, N.G. McDowell, R. G. Knox, C. D. Koven, **J.A. Holm**, B. M. Rogers, D. M. Lawrence, and G. B. Bonan. Taking off the training wheels: the properties of dynamic vegetation models without climate envelopes. *Geosci. Model. Dev.* 8: 3593-3619, 2015.
- Holm, J.A.**, J.Q. Chambers, W.D. Collins. Forest response to increased disturbance in the Central Amazon and comparison to Western Amazonian forests. *Biogeosciences*, 11, 5773-5794, 2014.
- Bond-Lamberty, B., J. Fisk, **J.A. Holm**, V. Bailey, and C. M. Gough. Moderate forest disturbance as a stringent test for gap and big-leaf models, *Biogeosciences*, 12, 513-526, 2014.
- Holm, J. A.**, K. Jardine, A.B. Guenther, J.Q. Chambers, and E. Tribuzy. Evaluation of MEGAN-CLM parameter sensitivity to predictions of isoprene emissions from an Amazonian rainforest, *Atmos. Chem. Phys. Discuss.*, 14, 23995-24041, doi:10.5194/acpd-14-23995-2014, 2014.

- Holm, J.A.**, J. R. Thompson, W. J. McShea, and N. A. Bourg. Interactive effects of chronic deer browsing and overstory disturbance on forest successional dynamics. *Ecosphere*. 4: 144, <http://dx.doi.org/10.1890/ES13-00223>, 2013.
- Holm, J. A.**, H. H. Shugart, S. J. Van Bloem, and G. Larocque. Gap model validation for a subtropical dry forest and predicting poor transition of abandoned fields into secondary forests in Puerto Rico. *Ecol. Modelling* 233: 70-82, 2012.
- Cropper, W. P. Jr., **J. A. Holm**, C. J. Miller. An inverse analysis of a matrix population model using a genetic algorithm. *Ecological Informatics* 7:41-45, 2012.
- Pack, J., L. Unruh Snyder, T. Durham, **J. A. Holm**, F. Allen, J. Leeds, R. Arias. Comparative agroecosystem sustainability of five Honduran crop production systems. *Inten. J. of Environmental, Cultural, Economic and Social Sustainability* 7:121-132, 2011.
- Shiels, A., J. Zimmerman, D. Garcia-Montiel, I. Jonckheere, **J. A. Holm**, D. Horton, N. Brokaw. Plant responses to simulated hurricane impacts in a subtropical wet forest, Puerto Rico. *J. of Ecology* 98: 659-673, 2010.
- Holm, J. A.**, C. J. Miller, and W. P. Cropper Jr. Population dynamics of the dioecious Amazonian palm *Mauritia flexuosa*: simulation analysis of sustainable harvesting. *Biotropica* 40: 550-55, 2008.

Book Chapters

- Larocque, G.R., H.H. Shugart, W. Xi and **J.A. Holm**. "Models of Forest Succession", *Ecological Forest Management Handbook*. Taylor & Francis Group/CRC Press. London, 2015.
- Larocque, G.R., A. Komarov, O. Chertov, V. Shanin, J. Liu, J. S. Bhatti, W. Wang, C. Peng, H. H. Shugart, W. Xi, and **J.A. Holm**. "Process-Based Models: A Synthesis of Models and Applications to Address Environmental and Management Issues", *Ecological Forest Management Handbook*. Taylor & Francis Group/CRC Press. London, 2015.

Invited Presentations

- Holm, J.A.**, et al. "Linking ecosystem demography modeling and field experiments to understand tropical forest response to novel disturbance regimes" INTERFACE/CLIMMANI Terrestrial Ecosystems at Thresholds Workshop, Florence Italy, April 12-15, 2016.
- Holm, J.A.**, Dr. H. H. Shugart, S. J. Van Bloem, "Modeling forest disturbance and recovery in secondary subtropical dry forests of Puerto Rico." *AGU Fall Meeting*. San Francisco, CA. December 9-13, 2015.
- Holm, J.A.** "Modeling tropical forest response to a changing climate system." Presentation at the Frontiers for Global Change Science at the Aspen Global Change Institute, August, 2014.
- Holm, J.A.**, Scientific presentation at 2011 CARICOM Annual Board Meeting and Seminar, Placencia, Belize. July 20-24, 2011.
- Holm, J.A.**, D. Lawrence, L. Schneider, J. Rogan, B. Schmook. "Environmental disturbance in the Greater Yucatan (EDGY) Project." Joint USLTER/MEXLTER Meeting on Response to Disturbance. Merida, Mexico. January 13-15, 2009.
- Holm, J.A.**, J. Zimmerman, A. Shiels, D. Horton. "Canopy Trimming Experiment (CTE) Results, Luquillo Puerto Rico." Joint USLTER/MEXLTER Meeting on Response to Disturbance. Merida, Mexico. January 13-15, 2009.

Selected Presentations

- Holm, J.A.,** R. Fisher et al. Vegetation demographics in Earth System Models: capturing tropical forest response to novel disturbance regimes. DOE ESS PI Meeting, Potomac, MD. April 26-27, 2016.
- Holm, J.A.** et al. Modeling Amazon forest vegetation dynamics and community response to increased wind disturbances. *AGU Fall Meeting*. San Francisco, CA. December 9-13, 2015.
- Holm, J.A.,** R.G. Knox, C. D. Koven, R. A. Fisher, J.Q. Chambers, W.J. Riley, S. Muszala, N. Higuchi. Linking an ecosystem demography model to CLM as a basis for representing carbon cycling dynamics in tropical forests. *ESA 100th Annual Meeting*. Baltimore, MD. August 9-14, 2015.
- Holm, J.A.,** R.G. Knox, C.D. Koven, W.J. Riley, J. Tang, Q. Zhu, B. Ghimire, J. Chambers, R. Fisher. Traits and trait filtering from the soil to the canopy. *ACME All Hands Meeting*. Tysons Corner, VA, May 5-7, 2015.
- Holm, J.A.,** R.G. Knox, C.D. Koven, W.J. Riley, R.A. Fisher, S. Muszala, J.Q. Chambers, N. Higuchi. "Using CLM-ED as a basis for representing carbon cycling dynamics in tropical forests". *CESM Land Model and Biogeochemistry Working Group Meetings*. Boulder, CO. March 2-5, 2015.
- Holm, J.A.,** J.Q. Chambers, W.D. Collins. "Forest response to increased disturbance in the Central Amazon and comparison to Western Amazonian forests." *AGU Fall Meeting*. San Francisco, CA. December 15-19, 2014.
- Knox, R.G., J.Q. Chambers, **J.A Holm**, N. Higuchi, M. Longo, P.R. Moorcroft, W.J. Riley, A.O. Manzi, C.D. Koven. "An evaluation of processes critical to predicting the carbon sink of natural tropical forests in a demographic vegetation model." *AGU Fall Meeting*. San Francisco, CA. December 15-19, 2014.
- Knox, R.G., **J.A. Holm**, C.D. Koven, J.Q. Chambers, .WJ. Riley, R.A. Fisher, S. Muszala, N. Higuchi. "Comparing CLM and CLM-ED as a basis for representing carbon cycling dynamics in a Central Amazonian forest". *AGU Fall Meeting*. San Francisco, CA. December 15-19, 2014.
- Holm, J.A.,** J.Q. Chambers, W.D. Collins. "Impacts of continual and periodic disturbance on a Central Amazon forest: lessons from a gap model for future model development." *AGU Fall Meeting*. San Francisco, CA. December 9-13, 2013.
- Holm, J.A.** J.Q. Chambers. "Forest mortality and disturbance in the Community Land Model (CLM)." *CESM Land Model and BGC Working Group Meetings*. Boulder, CO. February 20-22, 2013.
- Holm, J.A.,** J.Q. Chambers. "Regional impacts of Atlantic Forest deforestation on climate and vegetation dynamics." *AGU Fall Meeting*. San Francisco, CA. December 5-9, 2012.
- Holm, J.A.,** Dr. H. H. Shugart, S. J. Van Bloem, G. Larocque. "Gap model validation for a subtropical dry forest and response to hurricane disturbances in climate change scenarios." *AGU Fall Meeting*. San Francisco, CA. December 5-9, 2011.
- Holm, J.A.,** Dr. H. H. Shugart, Dr. Skip Van Bloem. "Gap dynamic modeling of a dry tropical forest: monitoring forest change and succession in Puerto Rico with changing environments. *Poster presentation at the ESA 95th Annual Meeting*. Pittsburg, PA. August 1-6, 2010.
- Holm, J.A.,** Dr. Laura Schneider, Dr. John Rogan, Dr. Birgit Schmook. "Large-scale damage assessment from Hurricane Dean in the dry tropical forests of the Yucatan Peninsula". *Presentation at the ESA 94th Annual Meeting*. Albuquerque, New Mexico. August 2-7, 2009.
- Holm, J.A.,** D. Horton, J. K. Zimmerman, A. Shiels. "Tree dynamics following simulated

hurricane damage in the Luquillo Experimental Forest, Puerto Rico.” *Poster presentation at the ESA 93rd Annual Meeting*. Milwaukee, WI, August 4-8, 2008.

Honors and Awards

Robert J. Huskey Travel Fellowship, May 2011
Delta Epsilon Iota Academic Honor Society Membership, April 2007
Gamma Sigma Delta Honor Society Membership, December 2006
Tropical Conservation and Development Field Research Grant Recipient, May 2006

Collaborations and Affiliations

Aspen Global Change Institute; Climate Voices: science speakers network; Ecological Society of American; American Geophysical Union, The Nature Conservancy – California; Joint Global Change Research Institute; National Center for Atmospheric Research (NCAR).

Skills

Programming capabilities in Matlab, C++, Fortran, Python, SAS
Basic GIS skills
Excellent in research, analytical, and writing skills
Excellent skills in Excel, Word, PowerPoint, and presentation skills to the public and scientists

Teaching Experience

Fundamentals of Ecology Lab, University of Virginia
Management of Forest Ecosystems, University of Virginia
Global Ecology, Graduate Level, University of Virginia
Practical Concepts in Environmental Sciences, University of Virginia

Graduate and Postdoctoral Advisors

Jeffrey Chambers, LBNL, Postdoctoral Advisor, 2012-present.
William D. Collins, LBNL, Postdoctoral Advisor, 2012-present.
Jonathan R. Thompson, Smithsonian Institute, Postdoctoral Advisor, 2012.
Hank H. Shugart, University of Virginia, PhD Advisor, 2008-2012.
Wendell P. Cropper Jr., University of Florida, M.S. Advisor, 2005-2007.

References

Dr. Jeffrey Chambers, jchambers@lbl.gov, 510.495.2932
Dr. William Collins, wcollins@lbl.gov, 510.495.2407
Dr. Hank Shugart, hhs@virginia.edu, 434.924.7642