

Amanda M. Schwantes, PhD

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Department of Ecology and Evolutionary Biology
University of Toronto
Earth Sciences Centre 3041

EDUCATION

Duke University, Durham, NC

Dec 2017

PhD, Ecology

University Program in Ecology. Nicholas School of the Environment

Dissertation: *Monitoring and Forecasting Forest Drought
Stress to a Changing Climate*

Committee: Drs. Jennifer J. Swenson, Robert B. Jackson,
James S. Clark, and Amilcare Porporato

University of Virginia, Charlottesville, VA

May 2009

BS, Environmental Science with Highest Distinction and

BA, Chemistry (Double Major)

ACADEMIC EMPLOYMENT

University of Toronto. Department of Ecology and Evolutionary Biology.
Postdoctoral Fellow

Apr 2021 - present

1 year maternity leave

Mar 2020 - Mar 2021

University of Toronto. Department of Ecology and Evolutionary Biology.
Postdoctoral Fellow

Oct 2019 - Feb 2020

Duke University. Nicholas School of the Environment.
Postdoctoral Associate

Dec 2017 - Aug 2019

RESEARCH INTERESTS

Ecosystem services, forest disturbance, global change ecology, remote sensing, and geospatial analysis

PEER-REVIEWED PUBLICATIONS

1. Firkowski CR, **Schwantes AM**, Fortin M-J, and Gonzalez A. (2021). Monitoring social-ecological networks for biodiversity and ecosystem services in human-dominated landscapes. *Facets*. 6, 1670-1692.
2. Clark JS, Andrus R, Aubry-Kientz M, Bergeron Y, Bogdziewicz M, Bragg DC, Brockway D, Cleavitt NL, Cohen S, Courbaud B, Daley R, Das AJ, Dietze M, Fahey TJ, Fer I, Franklin JF, Gehring CA, Gilbert GS, Greenberg CH, Guo Q, Hille Ris Lambers J, Ibanez I, Johnstone J, Kilner CL, Knops J, Koenig WD, Kunstler G, Lamontagne JM, Legg KL, Luongo J, Lutz JA, Macias D, McIntire EJ, Messaoud Y, Moore CM, Moran E, Myers JA, Myers OB, Nunez C, Parmenter R, Pearson S, Poulton-Kamakura R, Ready E, Redmond MD, Reid CD, Rodman KC, Scher CL, Schlesinger WH, **Schwantes AM**, Shanahan E, Sharma S, et al. (2021) Continent-wide tree fecundity driven by indirect climate effects. *Nature Communications*. 12, 1242.

3. Austin KG, **Schwantes AM**, Gu Y, Kasibhatla PS. (2019). What causes deforestation in Indonesia? *Environmental Research Letters*. 14, 024007.
4. **Schwantes AM**, Parolari AJ, Swenson JJ, Johnson DM, Domec JC, Jackson RB, Pelak N, and Porporato A. (2018). Accounting for landscape heterogeneity improves spatial predictions of tree vulnerability to drought. *New Phytologist*. 220, 132-146.
5. Johnson DM, Domec JC, Berry ZC, **Schwantes AM**, McCulloh KA, Woodruff DR, Polley HW et al. (2018). Co-occurring woody species have diverse hydraulic strategies and mortality rates during an extreme drought. *Plant, Cell & Environment*. 41, 576-588.
6. Gray PC, Ridge JT, Poulin SK, Seymour AC, **AM Schwantes**, Swenson JJ, and Johnston DW. (2018). Integrating drone imagery into high resolution satellite remote sensing assessments of estuarine environments. *Remote Sensing*. 10, 1257.
7. **Schwantes AM**, Swenson JJ, González-Roglich M, Johnson DM, Domec JC, and Jackson RB. (2017). Measuring canopy loss and climatic thresholds from an extreme drought along a fivefold precipitation gradient across Texas. *Global Change Biology*. 23, 5120-5135.
8. Austin KG, González-Roglich M, Schaffer-Smith D, **Schwantes AM**, and Swenson JJ. (2017). Trends in size of tropical deforestation events signal increasing dominance of industrial-scale drivers. *Environmental Research Letters*. 12, 054009.
9. **Schwantes AM**, Swenson JJ, and Jackson RB (2016). Quantifying drought-induced tree mortality in the open canopy woodlands of central Texas. *Remote Sensing of the Environment*. 181, 54-64.
10. McDowell NG, Coops NC, Beck PSA, Chambers JQ, Gangodagamage C, Hicke JA, Huang C, Kennedy R, Krofcheck DJ, Litvak M, Meddens AJH, Muss J, Negrón-Juarez R, Peng C, **Schwantes AM**, Swenson JJ, Vernon LJ, Williams AP, Xu C, Zhao M, Running SW, and Allen CD (2015). Global satellite monitoring of climate-induced vegetation disturbances. *Trends in Plant Science*. 20(2), 114-123.
11. Tully KA, Wood TE, **Schwantes AM**, and Lawrence D (2013). Soil nutrient availability and reproductive effort drive patterns in nutrient resorption in *Pentaclethra macroloba*. *Ecology*. 94(4), 930-940.

MANUSCRIPTS IN PREPARATION, SUBMITTED, OR IN REVIEW

1. **Schwantes AM***, Firkowski CR*, Flavio A, Rodriguez PS, Fortin M-J, and Gonzalez A. Monitoring ecosystem services with Essential Ecosystem Service Variables. *co-first authors. (in review at *Frontiers in Ecology and the Environment*)
2. **Schwantes AM**, Firkowski CR, Rodriguez PS, Gonzalez A and Fortin M-J. A comparison of approaches to quantify carbon for ecosystem service assessments through time. (submitted to *FACETS*)
3. **Schwantes AM**, Firkowski CR, Gonzalez A and Fortin M-J. Bayesian Belief Networks reveal how an underlying driver shapes interactions among ecosystem services. (in preparation)

GRANTS, FELLOWSHIPS, & HONORS

- NASA Advanced Information Systems Technology (AIST) Program 2019
“The bridge from canopy condition to continental scale biodiversity forecasts, including the rare species of greatest conservation concern”
JJ Swenson (PI), JS Clark (Co-PI), A Gelfand (Co-I), AM Schwantes (Co-I), B Seyednasrollah (Co-I), (2 yr, \$574,926)
- Duke Graduate School Fellowship (stipend/tuition 1 yr) 2016

• NASA Earth and Space Science Fellowship (stipend/tuition 3 yrs, \$30,000/yr)	2013-2015
• James B. Duke Fellowship (stipend supplement 4 yrs, \$5,000/yr)	2012-2015
• AmeriCorps Segal Education Award (\$4725)	2010
• College of Arts and Sciences Grant (undergraduate research funding, \$1500)	2008
• Raven Fellowship (undergraduate research funding, \$2500)	2008
• University of Virginia Distinguished Majors Program (Highest Distinction)	2009
• University of Virginia Dean's List (8/8 semesters)	2005-2009

ORAL PRESENTATIONS

1. Schwantes AM, Firkowski CR, Flavio A, Rodriguez PS, Fortin M-J, and Gonzalez A. 2022. Detecting and attributing trends in Essential Ecosystem Service Variables. Virtual. World Biodiversity Forum, Davos, Switzerland.
2. Schwantes AM, Swenson JJ, and Clark JS. 2018. Projected expansion of woodland communities and retraction of Eastern hardwoods in response to drought across Texas. ESA Annual Meeting. New Orleans, LA.
3. Schwantes AM, Parolari AJ, Swenson JJ, Johnson DM, Domec JC, Jackson RB, Pelak N, and Porporato A. 2017. Accounting for landscape heterogeneity improves spatial predictions of tree vulnerability to drought. AGU Fall Meeting. New Orleans, LA.
4. Schwantes AM, Swenson JJ, González-Roglich M, Johnson DM, Domec JC, and Jackson RB. 2017. Drought-induced canopy loss: Climate thresholds and extent of dieback along a 5-fold precipitation gradient across Texas. ESA Annual Meeting. Portland, OR.
5. Schwantes AM, Swenson JJ, González-Roglich M, Johnson DM, Domec JC, and Jackson RB. 2016. Drivers of drought-induced tree mortality across Texas. US-IALE Annual Meeting. Asheville, NC.
6. Schwantes AM, Swenson JJ, Johnson DM, Domec JC, and Jackson RB. 2013. Drought-induced Canopy Loss in Texas. Remote sensing of vegetation mortality: challenges, solutions, and ecological understanding Institute of Geophysics and Planetary Physics (IGPP) workshop. Los Alamos National Laboratory. Santa Fe, NM.
7. Schwantes AM, Swenson JJ, and Jackson RB. 2013. Quantifying Drought-induced Canopy Loss at Multiple Scales in Texas. US-IALE Annual Meeting. Austin, TX.

CONFERENCE POSTERS

1. Schwantes AM, Swenson JJ, González-Roglich M, Johnson DM, Domec JC, and Jackson RB. 2016. Identifying Climatic Thresholds that Control the Spatial Patterning of Drought-Induced Canopy Loss across a 5-Fold Precipitation Gradient in Texas. AGU. San Francisco, CA.
2. Schwantes AM, Swenson JJ, Johnson DM, Domec JC, and Jackson RB. 2015. Quantification of Drought-Induced Tree Mortality in Texas: Fine scale to Regional Estimates. AGU. San Francisco, CA.
3. Schwantes AM, Swenson JJ, Johnson DM, Domec JC, and Jackson RB. 2015. Quantification of Drought-Induced Tree Mortality in Texas: Fine scale to Regional Estimates. NASA Carbon Cycle & Ecosystems Joint Science Workshop. Hyattsville, MD.
4. Schwantes AM, Swenson JJ, Johnson DM, Domec JC, and Jackson RB. 2014. Who Died, Where? Quantification of Drought-Induced Tree Mortality in Texas. AGU. San Francisco, CA.

RESEARCH EXPERIENCE

Department of Ecology and Evolutionary Biology. University of Toronto.
Postdoctoral Fellow

Apr 2021 - present
Oct 2019-Feb 2020

Research advisor: Dr. Marie-Josée Fortin

- Monitoring ecosystem services by integrating datasets, including field, census, citizen science, and remotely sensed data
- Attributing the drivers influencing ecosystem services and their interactions using Bayesian Belief Networks
- Review of carbon storage and sequestration assessments
- Monitoring supply, demand, and use for the service of air quality regulation in Canadian cities
- Took a 1-year maternity leave from Mar 2020 - Mar 2021

Nicholas School of the Environment. Duke University, Durham, NC.
Postdoctoral Associate

Dec 2017-Aug 2019

Research advisors: Dr. James S. Clark and Dr. Jennifer J. Swenson

- Forecasted community reorganization with climate change by integrating biodiversity data with remotely sensed datasets using a Generalized Joint Attribute Model (GJAM)
- Built a web app for researchers/decision makers to view and interact with model outputs (R Shiny/Leaflet) and a python package (geedataextract) for improving accessibility of remote sensing data (Google Earth Engine)
- Investigated how vegetation structure metrics derived from LiDAR improve estimates of species abundance of small mammals
- Mentored 1 master student and 3 PhD students

Nicholas School of the Environment. Duke University, Durham, NC.
Doctoral Research

Sep 2012-Dec 2017

Research advisors: Dr. Jennifer J. Swenson and Dr. Robert B. Jackson

- Developed remote sensing approaches for monitoring forest disturbance, using machine-learning, statistical and geospatial analysis (Python, R, and IDL).
- Forecasted future forest vulnerability to drought stress in Texas, by quantifying how often climate conditions associated with greater tree mortality were projected to occur into the 21st century
- Developed a non-linear stochastic model of soil moisture dynamics incorporating soil, aspect, and topography, to understand how landscape heterogeneity creates refugia, which are locally buffered/protected from future droughts (MATLAB).

Abt Associates. Bethesda, MD.
Research Assistant

Nov 2011-Aug 2012

- Maintained a product database for EPA's Safer Product Labeling Program.
- Updated dose response modeling reports for drinking water contaminants.

Department of Environmental Sciences. University of Virginia, Charlottesville, VA. Sep 2007-May 2009

Undergraduate Research

Research advisors: Dr. Deborah Lawrence and Dr. Katherine L. Tully.

- Received highest distinction for DMP thesis: Effect of soil nutrient availability and reproductive effort on nutrient resorption in *Pentaclethra macroloba*.

TEACHING EXPERIENCE

Co-instructor, ENVIRON 590-54: LiDAR Remote Sensing Spring 2018

- Co-taught 1-credit class with another PhD candidate. Class included lecture and hands-on lab instruction for processing Lidar using FUSION and ArcGIS

Teaching Assistant, ENVIRON 857L: Remote Sensing for Environmental Analysis Fall 2017

- Guest lecturer for 2 classes and one lab demonstration

Workshop instructor May 2019

- Co-instructor for workshop on “Generative Models to Forecast Community Reorganization with Climate Change” at NASA’s Biodiversity and Ecological Forecasting Team Meeting

COMMUNITY INVOLVEMENT AND PROFESSIONAL SERVICE

Reviewer for the following journals:

Ecosystem Services
Global Change Biology
New Phytologist
Remote Sensing
Science of the Total Environment
Journal of Applied Remote Sensing

Volunteer Mentor. ELEMENT. Duke University, NC. Fall 2018

Taught 1-hour environmental education lessons at a local elementary school (four lessons total over two months).

Trails Program Manager. AmeriCorps Volunteer. Incline Village, NV. 2009-2010

Recruited/managed volunteers for Tahoe Rim Trail Association. Assisted with environmental education hikes and backpacking trips for young adults.

Biotech Intern. Student Conservation Association. Death Valley, CA. 2010-2011

Conducted surveys of native/invasive plants at Death Valley National Park.

Volunteer. Boys and Girls Club. Charlottesville, VA. 2006-2007

Assisted in nature related art activity for young children (2 hours/wk).

Treasurer. Environmental Sciences Organization. U.Va. student group. 2007-2009

Organized activities to foster student and faculty interactions.

Program Director. Rivanna Trails-Madison House. U.Va. student group. 2006-2009

Organized volunteers for trail maintenance for the Rivanna Trails Foundation.

Restoration Intern. Student Conservation Association. Gatlinburg, TN. 2007

Removed invasive species at Great Smoky Mountains National Park.