

# Christine R. Rollinson

Forest Ecologist, The Morton Arboretum  
crollinson@mortonarb.org

Twitter: @RolliEcology  
web: www.rolliecolony.com  
code: github.com/crollinson  
github.com/MortonArb-ForestEcology

## EDUCATION

- 2014      **Ph.D. in Ecology**  
**The Pennsylvania State University, University Park, PA**  
*Dissertation:* Climate and community assembly in Central Appalachian forests
- 2010      **M.S. in Ecology**  
**The Pennsylvania State University, University Park, PA**  
*Thesis:* Simulated climate change alters post-clear cut forest vegetation communities
- 2008      **B.A. in Biology (High Honors), Environmental Studies,**  
**Oberlin College, Oberlin, OH**  
*Honors Thesis:* The effects of low-intensity selective timber harvesting and community structure on invasive species distribution of woody vegetation in northern Ohio

## PROFESSIONAL EXPERIENCE

- 2017-pres.      **Forest Ecologist, Morton Arboretum, Lisle, IL.**  
Forest and community ecology research to advance local and global tree conservation.
- 2014-2016      **Postdoctoral Research Associate, Boston University, Boston, MA**  
Assessment of terrestrial ecosystem models using modern and paleo-ecological data.
- 2012-2013      **NSF GK12 Fellow: CarbonEARTH, The Pennsylvania State University, PA**  
Develop earth science curriculum that integrates research into classroom activities for an inner-city eighth grade classroom
- 2011      **NSF IRES Fellow: Ecological Research in Spain, The Pennsylvania State University, PA**  
Effects of biodiversity and climate on forest and shrub vegetation in field and greenhouse studies
- 2008      **Research Technician, Idaho State University, Yellowstone National Park, ID/MT/WY**  
Monitor health of breeding amphibian populations in permanent and ephemeral wetlands in Yellowstone and Grand Teton National Parks
- 2007      **Stewardship Internship, Pine Butte Swamp Preserve, The Nature Conservancy, Choteau, MT**  
Land management activities including invasive plant control, native plant population monitoring, and grazing management
- 2006      **NSF REU Internship, Harvard Forest, Petersham, MA**  
Impacts of hemlock woolly adelgid infestations and evaluation of success of chemical treatment options
- Internship, Cooperative Forest Management, WestRock (formerly MWV), Covington, VA**  
Forest inventories and GIS support to aid land management recommendations to private landowners
- 2005      **Internship, Student Conservation Association, Great Smoky Mountains National Park, TN/NC**  
Monitoring and control of invasive plant and hemlock woolly adelgid infestations

# Christine R. Rollinson

## Internship, Warm Springs Mountain Preserve, The Nature Conservancy, Hot Springs, VA

GIS database management of preserve units, adjacent landowner information, and Virginia conservation cost-sharing programs

### WORKING GROUPS AND SERVICE

- 2017-present Chicago Wilderness Oak Ecosystem Recovery Working Group  
2018-present Climate Change Messaging Working Group, The Morton Arboretum

### PUBLICATIONS

- In press* **Rollinson, CR**, A Finley, MR Alexander, S Banerjee, K-A Dixon Hamil, LE Koenig, DH Locke, M Peterson, MW Tingley, K Wheeler, C Youngflesh, EF Zipkin. Working across space and time: nonstationarity in ecological research and application. *Frontiers in Ecology and the Environment*.
- 2019 Ettinger, AK, I Chuine, BI Cook, JS Dukes, AM Ellison, MR Johnston, AM Panetta, **CR Rollinson**, Y Vitasse, EM Wolkovich. How do climate change experiments alter plot-scale climate? *Ecology Letters* 22:748-763.
- Longo, M, RG Knox, DM Medvigy, NM Levine, MC Dietze, Y Kim, ALS Swann, K Zhang, **CR Rollinson**, RL Bras, SC Wofsy, PR Moorcroft. The biophysics, ecology, and biogeochemistry of functionally diverse, vertically- and horizontally-heterogeneous ecosystems: The Ecosystem Demography Model, version 2.2 – Part 1: Model description. *Geoscientific Model Design* 12:4309-4346.
- 2018 Alexander, MR, **CR Rollinson**, DJP Moore, JH Speer, DL Rubino. Determination of death dates of coarse woody debris of multiple species in the central hardwood region. *Tree Ring Research* 74:135-143.
- Fernandez, A, **CR Rollinson**, WS Kearney, MC Dietze, S Fagherazzi. Declining radial growth response of coastal forests to hurricanes and nor'easters. *Journal of Geophysical Research – Biogeosciences* 123: 832-849.
- Alexander, MR, **CR Rollinson**, F Babst, V Trouet, DJP Moore. Relative influence of multiple sources of uncertainty on cumulative and incremental tree-ring-derived aboveground biomass estimates. *Trees* 32:265-276.
- D'Orangeville, L, *et al.* [24 authors]. Drought timing and local climate determine the sensitivity of eastern temperate forests to drought. *Global Change Biology* 24:2339-2351.
- 2017 **Rollinson, CR**, Y Liu, A Raiho, DJP Moore, J McLachlan, D Bishop, A Dye, JH Matthes, A Hessler, T Hickler, N Pederson, B Poulter, T Quaipe, K Schaefer, J Steinkamp, MC Dietze. Changes in ecosystem structure only mediate sensitivity of net primary productivity to climate and CO<sub>2</sub> over multiple centuries. *Global Change Biology* 23:2755-2767.
- 2016 **Rollinson, CR**, MW Kaye, CD Canham. Interspecific variation in growth responses to climate and competition of five eastern tree species. *Ecology* 97:1003-1011.
- 2015 **Rollinson, CR**, MW Kaye. Modeling temperature in mountainous ecoregions: Importance of spatial scale for ecological research. *Climate Research* 64: 99-110.
- 2014 McDaniel, MD, RJ Wagner, **CR Rollinson**, BA Kimball, MW Kaye, JP Kaye. Microclimate and ecological threshold responses in a warming and wetting experiment following whole-tree harvest in central Pennsylvania. *Theoretical and Applied Climatology* 166: 287-299.
- 2012 **Rollinson, CR**, MW Kaye, LP Leites. Community assembly responses to warming and increased precipitation in an early successional forest. *Ecosphere* 3: art.122.

## Christine R. Rollinson

**Rollinson, CR**, MW Kaye. 2012. Experimental warming alters phenology of certain plant functional groups in an early-successional forest community. *Global Change Biology* 18: 1108-1116.

*In review*

**CR Rollinson**, Alexander, MR, AW Dye, DJP Moore, N Pederson, V Trouet. Understory trees are more climate sensitive than overstory trees in mesic forests. *Ecology*.

**Rollinson, CR**, A Dawson, AM Raiho, JW Williams, MC Dietze, T Hickler, ST Jackson, J McLachlan, DJP Moore, B Poulter, T Quaife, J Steinkamp, M Trachsel. Forest responses to last-millennium hydroclimate variability are governed by spatial variations in ecosystem sensitivity. *Ecology Letters*.

Salisbury, A, M Midgley, **C Rollinson**, G Watson, C Cannon, J Miesbauer. Tree selection, planting, and maintenance to improve tree health and benefits along highways. *Urban Forestry and Urban Greening*.

### GRANTS AND AWARDS

- 2020-2022 BII-Design: Developing a Tree-Focused Biological Integration Institute. *National Science Foundation, Biological Integration Institutes*. (co-PI)
- 2018-2022 The future of US forest function under changing climate, disturbance, and forest management. *National Science Foundation, Macrosystems Biology* (subaward/co-I)
- 2018-2021 Quantifying and sustaining the conservation value of four tree collections. *Institute of Museum and Library Services, Museums for America* (co-PI)
- 2019 Establishing a historical baseline for modern forest vulnerability, *The Morton Arboretum* (co-PI)
- 2018 Oak Ecosystems Recovery Research, *The Morton Arboretum* (co-PI)
- 2016 Travel Award. Professional Development and Postdoctoral Affairs. *Boston University*
- 2011 Graduate Research Fellow. *North American Dendroecological Fieldweek*
- ThinkSwiss Fellowship Grant. *Swiss State Secretariat for Education and Research and Swiss Federal Department of Foreign Affairs*
- Travel Grant. *College of Agricultural Sciences, The Pennsylvania State University*
- Travel Grant. *School of Forest Resources, The Pennsylvania State University*
- Ecology Travel Award. *Intercollege Graduate Degree Program in Ecology, The Pennsylvania State University*
- 2008-2010 Katherine Mabis McKenna Graduate Fellowship. *College of Agricultural Sciences, The Pennsylvania State University*
- 2008 Norman H. Wright Prize in Biology. *Oberlin College*

### RESEARCH PRESENTATIONS

\* indicates undergraduate mentee; \*\* indicates high school mentee;  
‡ indicates non-academic audience

#### *Invited Academic and Professional Seminars (External Only)*

- 2020 **Rollinson, CR**. Trees and climate change: Future challenges and opportunities for trees in natural and built landscapes. Seminar for Christopher B. Burke Engineering, Ltd. *Webinar*.<sup>‡</sup>
- 2019 **Rollinson, CR**. The past, present, and future of climate-driven change in US Forests. *School of Natural Resources and the Environment, University of Arizona, Tucson, AZ*. (student-selected speaker)

## Christine R. Rollinson

- Rollinson, CR.** Influence of climate and land management on US Forests; Past, Present, Future. *Climate, People, and Environment Program, University of Wisconsin, Madison.*
- 2017 **Rollinson, CR.** Past, present, and future changes to forests of the Midwest. *Wabash College, Crawfordsville, IN.*
- 2015 **Rollinson, CR,** Y Liu, MC Dietze, *et al.* Integrating contemporary- and paleo-ecological datasets across temporal scales through terrestrial ecosystem models. *Harvard Forest, Petersham, MA.*
- 2013 **Rollinson, CR,** MW Kaye. Climate and community assembly in Central Appalachian Forests. *Tree-Ring Talk, Laboratory of Tree-Ring Research, University of Arizona, Tucson, AZ.*
- 2011 Kaye, JP, MW Kaye, **CR Rollinson,** MD McDaniel. Adding insult to injury: How will climate change alter plant and soil recovery following soil harvesting. *Cary Institute of Ecosystem Studies, Milbrook, NY.*
- Invited Conference and Symposia Presentations*
- 2020 **Rollinson, CR.** Climate, weather, and plants: how past and future changes impact landscapes. *iLandscape: The Illinois + Wisconsin Landscape Show, Shaumburg, IL.* ‡
- Rollinson, CR.** The impact of climate change on tree selection and resiliency. *22<sup>nd</sup> Annual SavAtTree Seminar, Chicago Botanic Garden, Glencoe, IL.* ‡
- 2019 **Rollinson, CR.** What does climate change mean for forest management? *Illinois Forestry Association Annual Meeting, Elsah, IL.* ‡
- Rollinson, CR.** Plants in the landscape: How climate is altering landscapes. *North Carolina Green Industry Council Annual Water Symposium, Raleigh, NC.* ‡
- Rollinson, CR,** MR Alexander, B Zumwalde. Oak ecosystem restoration: using historical forest dynamics to inform management for a resilient future. *Wild Things Conference, Chicago, IL.* ‡
- Rollinson, CR.** Assessing impacts of climate change on trees and forests using field sampling, botanic garden collections, and citizen science. *Ecological Society of America annual meeting, Louisville, KY.* (lightning talk)
- 2016 **Rollinson, CR.** Past, present, and future effects of climate on forest composition and structure. *New England Chapter of The Wildlife Society annual fall workshop, Hadley, MA.* ‡
- Rollinson, CR,** *et al.* Impacts of paleo-climatic variability on ecosystem stability and model performance in the modern era. *American Geophysical Union fall meeting, San Francisco, CA*
- Rollinson, CR,** N Pederson *et al.* Evaluation of terrestrial ecosystem model climate sensitivity and structure using tree rings. *Third American Dendrochronology Conference, Mendoza, Argentina.*
- 2015 **Rollinson, CR,** Y Liu, MC Dietze, *et al.* Millennial-scale drivers of carbon storage and flux in terrestrial ecosystem models. *American Geophysical Union fall meeting, San Francisco, CA*
- Rollinson, CR,** Y Liu, MC Dietze, *et al.* Drivers of ecosystem variability across Temporal Scales: insights from a multi-model comparison of forest dynamics for the past millennium. *Ecological Society of America annual meeting, Baltimore, MD.*
- Contributed Conference and Symposia Presentations*
- 2019 **\*\*Oros, J,** B Zumwalde, MR Alexander, **CR Rollinson.** Effects of forest management and climate on the growth response and anatomical tradeoffs of red and white oak. *Ecological Society of America annual meeting, Louisville, KY.* (poster)

## Christine R. Rollinson

- Rollinson, CR**, B Zumwalde, B Reidy. Forecasting tree phenology and climate vulnerability by leveraging botanic garden collections and citizen science observations. *Ecological Society of America annual meeting, Louisville, KY*. (poster)
- Alexander, MRA, **CR Rollinson**, MG Midgley, LA Brudvig, NB Pavlovic. Not gone but often forgotten: Oak ecosystem site conditions and restoration practices affect growth of mature trees. *Ecological Society of America annual meeting, Louisville, KY*. (poster) [cancelled due to illness]
- 2018 \*Butkiewicz, CL, **CR Rollinson**. Forests on the Edge: Climate, Soil and Fire on the Prairie-Forest Boundary. *American Geophysical Union annual, Washington, DC*. (poster)
- Rollinson, CR**, A Desai, P Duffy, MC Dietze. Are future forests driven by climate or management? *American Geophysical Union annual meeting, Washington, DC*. (poster)
- Rollinson, CR**, A Dawson, A Raiho, JW Williams. Connecting pattern and process: climate variability does not correlate with ecosystem variability over the past millennium. *Ecological Society of America annual meeting, New Orleans, LA*.
- Alexander, MR, **CR Rollinson**, AW Dye, DJP Moore, V Trouet, N Pederson. Don't forget the little guys: Understory trees show dynamic climate sensitivity in northeastern US forests. *Ecological Society of America annual meeting, New Orleans, LA*.
- 2017 **Rollinson, CR**, PaEON Project. Ecosystem stability in a millennium of climate change in terrestrial ecosystem models. *Ecological Society of America annual meeting, Portland, OR*.
- Rollinson, CR**, J Simkins, I Fer, AR Desai, MC Dietze. Impacts of weather versus climate and driver uncertainty on multi-centennial ecosystem model simulations. *American Geophysical Union annual meeting, New Orleans, LA*.
- Fer, I, A Raiho, **CR Rollinson**, MC Dietze, PaEON Project. Paleoclimate reconstruction through Bayesian data assimilation. *American Geophysical Union annual meeting, New Orleans, LA*.
- Dietze, MC, *et al.* (12 authors), PaEON Project. Inferring biogeochemistry past: a millennial-scale multimodel assimilation of multiple paleoecological proxies. *American Geophysical Union annual meeting, New Orleans, LA*.
- Ettinger, AK, JS Dukes, MR Johnston, **CR Rollinson**, Wolkovich EM. Decreased soil moisture in warming experiments alters phenology. *Ecological Society of America annual meeting, Portland, OR*.
- D'Orangeville, L, *et al.* (27 authors). Atmospheric water demand and timing regulate temperate forest sensitivity to drought. *Ecological Society of America annual meeting, Portland, OR*.
- 2015 **Rollinson, CR**, Y Liu, MC Dietze, *et al.* Drivers of ecosystem variability in models and data for the past millennium. *10<sup>th</sup> Plant Biology Initiative Symposium, Boston, MA*. (poster)
- Rollinson, CR**, Y Liu, M Dietze, D Moore, *et al.* A multi-model comparison of carbon pools and fluxes for the past 1200 years in New England and the Upper Midwest. *5<sup>th</sup> North American Carbon Program Principle Investigators Meeting, Washington, DC*. (poster)
- 2014 Liu, Y, JH Matthes, **CR Rollinson**, *et al.* Assessing the long-term performance of terrestrial ecosystem models in the northeastern United States: linking model structure and output. *American Geophysical Union annual meeting, San Francisco, CA*. (poster)

## Christine R. Rollinson

- 2013 **Rollinson, CR**, MW Kaye, LP Leites. Experimental warming and increased precipitation alter early successional forest community assembly. *Ecological Society of America annual meeting, Minneapolis, MN.*
- Kaye, MW, **CR Rollinson**, MD McDaniel, RJ Wagner. Diverse insights into climate effects on northeastern forest assembly. *Biennial Northeastern Ecosystem Research Cooperative meeting, Saratoga Springs, NY.*
- 2012 Kaye, MW, RJ Wagner, MD McDaniel, **CR Rollinson**, JP Kaye. Cascading effects of climate change on an early-successional forest ecosystem. *Eco Summit, Columbus, OH.*
- Rollinson, CR**, et al. Comparing two different forest succession pathways in an abandoned homestead in southwest VA. *American Association of Geographers annual meeting, New York, NY.*
- 2011 **Rollinson, CR**, MW Kaye. Forests in a changing climate: the role of regeneration and establishment in determining future forest dynamics. *NCCR Climate School, Grindelwald, Switzerland.* (poster)
- 2010 **Rollinson, CR**, MW Kaye. Simulated climate change alters post-clear cut forest vegetation communities. *Ecological Society of America annual meeting, Pittsburgh, PA.*
- 2008 **Rollinson, CR**, R Laushman. An analysis of native and nonnative woody vegetation and biodiversity in forest plots with different selective logging histories. *2008 Midwest Evolution and Ecology Conference, Athens, OH.* (canceled due to weather)
- Rollinson, CR**, DA Orwig. Evaluating chemical treatments of Hemlock Woolly Adelgid in southern New England. *4<sup>th</sup> Hemlock Woolly Adelgid Symposium, Hartford, CT.* (poster)

### EDUCATION AND OUTREACH (NON-ACADEMIC AUDIENCES)

#### *Panels, Presentations, and Long-format Programming*

- 2020 *Coping with Climate Change: How Plants and People Respond to Our Rapidly Changing World.* The Morton Arboretum. Public Panel Discussion.
- 2019 *Oak Restoration: Past & Future Perspectives.* Thornhill Society, The Morton Arboretum. Public Lecture.
- Secrets from Very Old Trees.* Riverside Public Library. Public Lecture
- Overview of citizen-science phenology and tree-ring research at The Morton Arboretum.* The Morton Arboretum education program guides. Staff talk.
- 2018 *With Respect* (WSJM radio), host: John Smietanka. [podcast](#)
- The loong past, present, and future of trees – and us.* Chicago Science Fest. Public Lecture.
- The Future of Trees: Hope in a Changing Climate.* The Morton Arboretum. Public Panel. (~200 attendees) [YouTube](#)
- “Teacher Tuesday” table. The Morton Arboretum. (engaged 126 visitors in 1 hour)
- Presentation to The Morton Arboretum Natural Areas volunteers
- A ‘tour’ of climate change research at The Morton Arboretum.* Docents, The Morton Arboretum. Staff talk.
- Know Your Arboretum: Trees, Climate, and The Morton Arboretum.* The Morton Arboretum. All-staff Lecture.
- 2017 Career presentation to *Benedictine University Beta Beta Beta Honors Society, Lisle, IL.*

## Christine R. Rollinson

2012 Presentation to *Juniata-Mifflin Master Gardeners, Lewistown, PA*. "Phenology: what timing tells us."

### *Course Development and Instruction*

2018 Tracking Changes Through the Seasons. The Morton Arboretum.  
2017 Woodland Ecology (subject matter advisor). The Morton Arboretum Woodland Stewardship Program. Online.

### *Other Media Appearances (short-form)*

2019 WLS-TV ABC 7 Chicago (TV) Fall Color (October)  
WBEZ (radio): Fall Color (October), Zombie Trees (October)  
WBBM (radio): Fall color & plants (October)  
Worldview (WBEZ radio): [What trees can tell us about climate change](#).  
[WGN TV 'Around Town' segment](#) to promote science and Nature Connects art installation at The Morton Arboretum

## MENTORING AND ADVISING

### *Graduate Committee Member:*

#### *Purdue University*

Lindsay Darling (PhD, advisor: Brady Hardiman)

#### *University of Illinois – Chicago*

Philip Johnson (PhD, advisor: Emily Minor)

#### *DePaul University*

Abigail Leeper (MS 2020, advisor: Jalene LaMontagne)

### *Graduate Advisor: University of Illinois Urbana-Champaign*

2017-pres. M. McKinney (M.S.): Reproduction of *Phellodendron* spp.

### *Research Mentor: The Morton Arboretum Undergraduate Research Fellowship*

2020 A. Ernat (Iowa State): Inferring individual species phenology from remotely-sensed methods. (analytics)  
2019 J. Rivera Rodrigues (U. Puerto Rico – Humacao): Comparison of growth and recovery in response to drought stress across wood types. (dendrochronology)  
P. Giambuzzi (U. Sciences): Comparison of wood growth sensitivity to timing of optimal temperatures among trees varying in xylem anatomy and mycorrhizal association. (dendrochronology)  
2018 C. Butkiewicz (U. Maryland): Fire and stability of alternate prairie and woodland states of the pre-settlement landscape in the Midwestern US. (modeling)  
2017 S. Lopezalles (Cal Tech): Effects of prescribed burn regimes on growth of mature trees in a Midwest oak forest. (field project, dendrochronology)

### *Research Mentor: Illinois Math and Science Academy (state-run high school)* (parentheses indicate college attended upon graduation)

2017-2019 J. Oros (University of Chicago) – Anatomical trade-offs in xylem characteristics impact oak water use strategies. (dendrochronology, image analysis)  
2017-2018 M. Ye – Understanding growth anomalies in tree rings of oaks. (dendrochronology, analysis)

# Christine R. Rollinson

2017-2018 L. Liu (Harvard University), P. Dhanyi (University of Michigan) – Phenology of native and invasive Midwestern oaks and shrubs. (field project, phenology)

## PROFESSIONAL AFFILIATIONS

*Ecological Society of America*

*American Geophysical Union*

*Tree Ring Society*

## ADDITIONAL INFORMATION

### *Developer:*

Ecosystem Demography 2 (ED2, terrestrial ecosystem model; <https://github.com/EDmodel/ED2>),

Predictive Ecosystem Analyzer (PEcAn, ecological bioinformatics toolbox; [www.pecanproject.org](http://www.pecanproject.org), <https://github.com/PecanProject/pecan>)

*Data Analysis:* linear and generalized hierarchical mixed models, GIS and spatial analysis, terrestrial ecosystem modeling, species distribution modeling, dendrochronology

*Programming Languages:* R, Fortran

*Spoken Languages:* English (native), Spanish (proficient)

### *Professional Development*

2019 International Course on Wood Anatomy and Tree-Ring Ecology. Klosters, Switzerland.