

# Christine R. Rollinson

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## EDUCATION

**Ph.D., Ecology**, *The Pennsylvania State University, University Park, PA* (2014)

**M.S., Ecology**, *The Pennsylvania State University, University Park, PA* (2010)

**B.A., Biology (High Honors), Environmental Studies**, *Oberlin College, Oberlin, OH* (2008)

## PROFESSIONAL EXPERIENCE

**Forest Ecologist**, *The Morton Arboretum, Lisle, IL* (2017-present)

**Postdoctoral Research Associate**, *Boston University, Boston, MA* (2014-2016)

**NSF GK12 Fellow: CarbonEARTH**, *The Pennsylvania State University* (2012-2013)

**NSF IRES Fellow: Ecological Research in Spain**, *The Pennsylvania State University* (2011)

**Research Technician**, *Idaho State University, Yellowstone National Park, WY* (2008)

**Stewardship Intern**, *Pine Butte Swamp Preserve, The Nature Conservancy, Choteau, MT* (2007)

**NSF REU Intern**, *Harvard Forest, Petersham, MA* (2006)

**Intern**, *Cooperative Forest Management, WestRock (formerly MWV), Covington, VA* (2006)

**Intern**, *Student Conservation Association, Great Smoky Mountains National Park, TN/NC* (2005)

**Intern**, *Warm Springs Mountain Preserve, The Nature Conservancy, Hot Springs, VA* (2005)

## WORKING GROUPS AND SERVICE

*The Morton Arboretum*: strategic plan development (climate change; 2018-present), climate change institutional messaging (2017-present), institutional land acknowledgment (2019 – 2021)

*Ecological Forecasting Initiative Steering Committee* (2021-2023): guide organizational operations and particularly advise EFI in engagement with non-academic and non-governmental organizations and promote the inclusion of diverse demographics and career paths into the field of ecological forecasting; senior advisor to the EFI student association.

*Chicago Wilderness*: Oak Ecosystem Recovery Working Group (2017 – present); Climate Action Plan for Nature update (2023-present)

*Climate Change Alliance of Botanical Gardens* (2020-present)

## PEER-REVIEWED PUBLICATIONS

22. Bruns, EB, M Westwood, MP Griffith, AL Hipp, M Lobdell, A Meyer, **CR Rollinson**, S Still, L Worcester, S Hoban. 2023. Quantifying endangerment value: a promising tool to support curation decisions. *Slbbaldia*, *in press*
21. Record, S, C Boettiger, **CR Rollinson**. 2023. Synthesizing forecasts to inform decision-making and advance ecological theory. 2023. *Methods in Ecology and Evolution* 14:728-731.
20. Lewis, AS, **CR Rollinson**, AJ Allyn, J Ashander, S Brodie, CB Brookson, E Collins, MC Dietze, AS Gallinat, N Juvigny-Khenafou, G Koren, DJ McGlenn, H Moustahfid, JA Peters, NR Record, CJ Robbins, J Tonkin, GM Wardle. 2023. The power of forecasts to advance ecological theory. *Methods in Ecology and Evolution* 14:746-756.
19. Anderson-Teixeira, KJ, V Herrmann, **CR Rollinson**, B Gonzalez, EB Gonzalez-Akre, N Pederson, MR Alexander, CD Allen, R Alfaro-Sánchez, T Awada, JL Baltzer, PJ Baker, JD Birch, S Bunyavechewin, P Cherubini, SJ Davies, C Dow, R Helcoski, J Kašpar, JA Lutz, EQ Margolis, JT

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- Maxwell, S McMahon, C Piponiot, SE Russo, P Šamonil, AE Sniderhan, AJ Tepley, I Vašíčková, M Vlam, PA Zuidema. 2022. Joint effects of climate, tree size, and year on annual tree growth derived from tree-ring records of ten globally distributed forests. *Global Change Biology* 28:245-266.
18. Fitzpatrick, L, PJ Giambuzzi, A Sprietzer, B Reidy, SM Still, **CR Rollinson**. 2021. Improving phenology predictions for sparsely observed species through fusion of botanical collections and citizen-science. *Climate Change Ecology* 2:100032.
  17. **Rollinson, CR**, MR Alexander, AW Dye, DJP Moore, N Pederson, V Trouet. 2021. Understory trees are more climate sensitive than overstory trees in mesic forests. *Ecology* 102:e03264. Awards: Top Cited Article for *Ecology* (2021-2022)
  16. **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. 2021. Forest responses to last-millennium hydroclimate variability are governed by spatial variations in ecosystem sensitivity. *Ecology Letters* 24:498-508.
  15. **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. 2021. Working across space and time: nonstationarity in ecological research and application. *Frontiers in Ecology and the Environment* 19:66-72. Awards: Top Cited Article for *Frontiers in Ecology and the Environment* (2021-2022)
  14. **Rollinson, CR**. 2020. Surplus and stress control autumn timing. *Science* 370:1030-1031. Media Coverage: NPR [All Things Considered](#); [The Guardian](#); [Inside Climate News](#)
  13. Ettinger, AK, I Chuine, BI Cook, JS Dukes, AM Ellison, MR Johnston, AM Panetta, **CR Rollinson**, Y Vitasse, EM Wolkovich. 2019. How do climate change experiments alter plot-scale climate? *Ecology Letters* 22:748-763.
  12. Longo, M, RG Knox, DM Medvigy, NM Levine, MC Dietze, Y Kim, ALS Swann, K Zhang, **CR Rollinson**, RL Bras, SC Wofsy, PR Moorcroft. 2019. 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.
  11. Alexander, MR, **CR Rollinson**, DJP Moore, JH Speer, DL Rubino. 2018. Determination of death dates of coarse woody debris of multiple species in the central hardwood region. *Tree Ring Research* 74:135-143.
  9. Fernandez, A, **CR Rollinson**, WS Kearney, MC Dietze, S Fagherazzi. 2018. Declining radial growth response of coastal forests to hurricanes and nor'easters. *Journal of Geophysical Research – Biogeosciences* 123: 832-849.
  8. Alexander, MR, **CR Rollinson**, F Babst, V Trouet, DJP Moore. 2018. Relative influence of multiple sources of uncertainty on cumulative and incremental tree-ring-derived aboveground biomass estimates. *Trees* 32:265-276.
  7. D'Orangeville, L, J Maxwell, D Kneeshaw, N Pederson, L Duchesne, T Logan, D Houle, D Arseneault, CM Beier, DA Bishop, D Druckenbrod, S Fraver, F Girard, J Halman, C Hansen, JL Hart, H Hartmann, M Kaye, D Leblanc, S Manzoni, R Ouimet, S Rayback, **CR Rollinson**, R Phillips. 2018. Drought timing and local climate determine the sensitivity of eastern temperate forests to drought. *Global Change Biology* 24:2339-2351.
  6. **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 Quaife, K Schaefer, J Steinkamp, MC Dietze. 2017. 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.
  5. **Rollinson, CR**, MW Kaye, CD Canham. 2016. Interspecific variation in growth responses to climate and competition of five eastern tree species. *Ecology* 97:1003-1011.

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4. **Rollinson, CR**, MW Kaye. 2015. Modeling temperature in mountainous ecoregions: Importance of spatial scale for ecological research. *Climate Research* 64: 99-110.
3. McDaniel, MD, RJ Wagner, **CR Rollinson**, BA Kimball, MW Kaye, JP Kaye. 2014. 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.
2. **Rollinson, CR**, MW Kaye, LP Leites. 2012. Community assembly responses to warming and increased precipitation in an early successional forest. *Ecosphere* 3: art.122.
1. **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.

### REPORTS AND WHITE PAPER PUBLICATIONS (NOT PEER-REVIEWED)

1. Hoban, S, EB Bruns, MP Griffith, M Hahn, A Hipp, M Lobdell, A Meyer, **CR Rollinson**, L Worcester, M Westwood. 2023. Integrated collection development: Quantifying value of garden collections for decision making and prioritization. Botanic Gardens Conservation International-U.S.

### RESEARCH GRANTS AND AWARDS (Funded Only)

*National Science Foundation, Biodiversity on a Changing Planet.* Climate change and ecosystem function: reducing critical uncertainties from ecosystem acclimation. (co-PI, \$499,970, 2023-2026)

*National Science Foundation, Research Experiences for Undergraduates.* REU Site: Integrative tree science for the Anthropocene at The Morton Arboretum. (co-PI, \$352,016, 2023-2026)

*National Oceanic and Atmospheric Administration, Climate Program Office, National Integrated Drought Information System.* Building a more drought-resilient urban forest ecosystem. (PI, \$599,656, 2022-2024)

*National Science Foundation, Biological Integration Institutes.* BII-Design: Developing a Tree-Focused Biological Integration Institute. (co-PI, \$192,991, 2020-2022)

*National Science Foundation, Macrosystems Biology.* The future of US forest function under changing climate, disturbance, and forest management. (senior personnel/co-I, \$176,000, 2018-2022)

*Institute of Museum and Library Services, Museums for America.* Quantifying and sustaining the conservation value of four tree collections. (co-PI, \$249,771, 2018-2021)

*The Morton Arboretum.* Establishing a historical baseline for modern forest vulnerability. (co-PI, \$9,600, 2019)

*The Morton Arboretum.* Oak Ecosystems Recovery Research. (co-I, \$8,000, 2018)

### PRESENTATIONS: RESEARCH & PROFESSIONAL AUDIENCES (Past 3 years)

\* indicates undergraduate mentee; \*\* indicates high school mentee;

‡ indicates non-academic audience

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

2022 **Rollinson, CR.** Trees and climate change: using data from the past and present to build a better future. *Biology Department, Oberlin College, Oberlin, OH.*

**Rollinson, CR.** How climate change is changing forests. Chicago Region Trees Initiative Tree Risk Short Course: Changing Climate, Changing Urban Forests. (online)‡

#### *Invited Conference and Symposia Presentations*

2021 **Rollinson, CR.** Forecasting the impacts of climate change on trees by combining citizen science and arboretum collections diversity. *ArbNet 10<sup>th</sup> Anniversary Conference, virtual.*

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### *Contributed Conference and Symposia Presentations*

- 2022 Moreau, T, E Griswold, R Davis, M Burke, M Westwood, **CR Rollinson**, M Lobdell, S Ostoja. Getting started on developing your climate adaptation plan. *American Public Gardens Association annual meeting, Portland, OR.*
- Murphy, B, **CR Rollinson**, AR Desai, MC Dietze, P Duffy, N von Hedemann, C Schultz, CL Staudhammer, M Binford, C-S Fu, W Kleindl. Does management reinforce or mitigate climate change driven shifts in forest function? Integrating management in ensemble vegetation modeling. *American Geophysical Union annual meeting, Chicago, IL.*
- Darling, L, BS Hardiman, **CR Rollinson**. Forest patch history, species composition, and structure and their relationship to inequitable access to biodiversity and ecosystem services. *American Geophysical Union annual meeting, Chicago, IL.*
- Fitzpatrick, L, **CR Rollinson**, AR Desai, B Murphy, K Dreisilker, M Midgley. Management legacies interactions with forest structure influence forest biomass responses to climatic increases in atmospheric water vapor demand. *American Geophysical Union annual meeting, Chicago, IL.*
- McCormack, ML, N Tran, M Low, M Midgley, R Dybzinski, **CR Rollinson**, C Cannon, E Segal. Efficient root exploration strategies support greater whole-tree water use during summer drought. *American Geophysical Union annual meeting, Chicago, IL.*
- 2021 **Rollinson, CR**, S Shah\*\*, S Still, E Beckman. Using species environmental niche overlap to quantify value of botanical garden accessions and *ex situ* habitat suitability. *Ecological Society of America annual meeting, Long Beach, CA / virtual.* (poster)
- Fitzpatrick, L, **CR Rollinson**, AR Desai, MC Dietze. Analysis of the interactions of climate change and management on forest biomass using the Ecosystem Demography 2.0 model. *Ecological Society of America annual meeting, Long Beach, CA / virtual.*
- Reidy, B, **CR Rollinson**, L Fitzpatrick. How diverse botanical collections and citizen science inform predictions of tree phenology and vulnerability. *Ecological Society of America annual meeting, Long Beach, CA / virtual.* (poster)

### **EDUCATION AND OUTREACH (NON-PROFESSIONAL AUDIENCES) (Past 3 years)**

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

- 2023 *Annual Chicago Region Trees Initiative Partner Recognition Celebration: Panel on Urban Heat Islands and Urban Trees.* The Morton Arboretum. Public panel discussion.
- 2022 *Climate Conversations: Looking Back to Find a Way Forward.* The Morton Arboretum. Public panel discussion. ([online panel](#)); 135 registrants)
- The Plant a Trillion Trees Podcast* (Episode 104), host: Eva Monheim, Hal Rosner. [Podcast](#).
- 2021 Our Chicago: Town hall on impact of weather, climate change on our environment. ABC7 Chicago. [Online panel](#).
- Climate Change in our Landscape: future challenges and opportunities. The Morton Arboretum. Presentation as part of IL Master Naturalist training.
- Climate Change Close to Home.* The Morton Arboretum. Public presentation & panel discussion. (online)

#### *Selected Public Program or Educational Course Development and Instruction*

- [annual] Fall Color Walks. The Morton Arboretum
- 2022 Whiskey Walks. The Morton Arboretum.
- 2021 Illinois Master Naturalist training. The Morton Arboretum.
- Contributions to multiple [The Morton Arboretum virtual bundles](#) (free)

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### *Other Selected Media Appearances (not related to specific scientific publication)*

- 2023 Climate Change: [Daily Herald \(print\)](#)  
Drought Research: [WBBM \(radio\)](#), [Smart Cities Dive \(website\)](#)
- 2022 Tree Age and Longevity: [Chicago Tribune \(print\)](#)  
Climate Change: WBEZ (radio)  
Fall Color: [NBC Nightly News, Kids Edition \(TV, streaming\)](#), [959theRiver.com \(radio, online\)](#), [WBBM \(radio\)](#), [WLS-TV ABC7 \(TV\)](#), [Fox32 News \(TV; live 9/22\)](#), [Fox32 News \(TV; live 10/12\)](#) WBEZ (radio), [Chicago Tribune \(print\)](#), [Daily Herald \(print\)](#),
- 2021 Fall Color: WBEZ (radio), NCTV (TV), Hanna & Fred Show (radio), NBC Morning New (TV, live)

### **MENTORING AND ADVISING**

#### *Current Graduate Committees:*

- Lindsay Darling, *Purdue University* (PhD, advisor: Brady Hardiman)  
Renata Poulton Kamakura, *Duke University* (PhD, advisor: Jim Clark)  
Philip Johnson, *University of Illinois – Chicago* (PhD, advisor: Emily Minor)  
Kiley Chernicky, *DePaul University* (MS, advisor: Jalene LaMontagne)

#### *Past Graduate Student Committees*

- Abigail Leeper, *DePaul University* (MS 2020, advisor: Jalene LaMontagne)  
M. McKinney, *University of Illinois, Urbana-Champaign* (2017-2019, M.S.)

#### *Undergraduate Research Mentor:*

##### *NSF REU Site (2019-present); The Morton Arboretum Undergraduate Research Fellowship (2017-2018)*

- 2022 L. Alvarez (Aurora U. / U. Wisconsin - Madison): Investigating oak decline at The Morton Arboretum (field project)
- 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. (ecosystem modeling)
- 2017 S. Lopezalles (Cal Tech): Effects of prescribed burn regimes on growth of mature trees in a Midwest oak forest. (field project, dendrochronology)

#### *High School Research Mentor (parentheses indicate college attended upon graduation)*

- 2020-2022 S. Shah (Northwestern University) – data visualization and analysis
- 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)

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- 2017-2018 L. Liu (Harvard University) – Phenology of native and invasive Midwestern oaks and shrubs. (field project, phenology)  
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, American Public Gardens Association

### 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, Bash/Shell

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

#### *Professional Development*

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