

Evan M. Gora

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Disturbance Ecology and Decomposition

Ecosystem science, community ecology, and plant physiology

Ecological effects of lightning on plants – patterns and processes of plant mortality – biotic, environmental, and biogeochemical controls of decomposition – forest carbon cycling

EDUCATION

- 2018 **PhD. Biology**, University of Louisville, Advisor: Dr. Stephen Yanoviak
Guy Stevenson Award – University-wide award to the most outstanding doctorate
Dissertation: *Dead wood and decomposition: vertical patterns, long-term processes, and the role of lightning*
- 2013 **B.S. Biology**, University of Pittsburgh, Advisor: Dr. Walter Carson
Honors Degree in Biology, **Major** in Economics, **Minor** in Chemistry
Thesis: *Patterns of coarse woody debris volume among 18 late-successional and mature forest stands in Pennsylvania*
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PROFESSIONAL POSITIONS

- 2021-pres. **Research Fellow**, Cary Institute of Ecosystem Studies
- 2020-pres. **Earl S. Tupper Postdoctoral Fellow**, Smithsonian Tropical Research Institute
Advisor: Helene Muller-Landau
- 2018-2020 **Postdoctoral Associate**, University of Louisville
Advisor: Stephen Yanoviak
- 2017 **NSF Graduate Research Intern**, Smithsonian Institution
Advisor: Helene Muller-Landau
- 2015-2016 **STRI Fellow**, Smithsonian Tropical Research Institute
Advisor: Joe Wright
- 2015-2018 **NSF Graduate Research Fellow**, University of Louisville
Advisor: Stephen Yanoviak
- 2013-2014 **Research Technician**, University of Louisville
PI: Stephen Yanoviak
- 2013 **Research Technician**, University of Pittsburgh
PI: Walter Carson
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PUBLICATIONS

†Authors contributed equally; Denotes mentored undergraduate author

20. Gora†, E.M., and A. Esquivel-Muelbert†. 2021. Implications of size-dependent tree mortality on tropical forest carbon dynamics. *Nature Plants*. 7: 384–391. doi: 10.1038/s41477-021-00879-0

19. **Gora, E.M.**, J.C. Burchfield, H.C. Muller-Landau, P.M. Bitzer, and S.P. Yanoviak. 2020. Pantropical geography of lightning-caused disturbance and its implications for tropical forests. *Global Change Biology*. 26: 5017– 5026. doi: 10.1111/gcb.15227
18. **Gora, E.M.**, H.C. Muller-Landau, P.M. Bitzer, J.C. Burchfield, S.P. Hubbell, and S.P. Yanoviak. 2020. A mechanistic and empirically supported lightning risk model for forest trees. *Journal of Ecology*. 108: 1956– 1966. doi: 10.1111/1365-2745.13404
--Harper Prize finalist for best paper by an early career scientist
17. **Gora, E.M.**, and S.P. Yanoviak. 2020. Lightning-caused disturbance in the Peruvian Amazon. *Biotropica*. 52: 813-817. doi: 10.1111/btp.12826
16. **Parlato, B.P.**, **E.M. Gora**, and S.P. Yanoviak. 2020. Lightning damage facilitates beetle colonization of tropical trees. *Annals of the Entomological Society of America*. saaa015. doi: 10.1093/aesa/saaa015
15. Yanoviak†, S.Y., **E.M. Gora**†, P.M. Bitzer, J.C. Burchfield, H.C. Muller-Landau, M. Detto, S. Paton, and S.P. Hubbell. 2020. Lightning is a major cause of large tree mortality in a neotropical forest. *New Phytologist*. 225: 1936-1944. (co-first author)
14. Lucas, J.M., **E.M. Gora**, **A. Salzberg**, and M. Kaspari. 2019. Antibiotics as chemical warfare across multiple taxonomic domains and trophic levels. *Proc. Roy. Soc. B*. 286: 20191536 (Cover)
13. **Gora, E.M.**, and J.M. Lucas. 2019. Dispersal and nutrient limitations of decomposition above the forest floor: evidence from experimental manipulations of epiphytes and macronutrients. *Functional Ecology*. 33: 2417-2429.
12. Adams, B.J., **Gora, E.M.**, and S.P. Yanoviak. 2019. Do lianas shape ant communities in an early successional tropical forest? *Biotropica*. 51: 885-893.
11. **Gora, E.M.**, J.M. Lucas, and S.P. Yanoviak. 2019. Microbial composition and decomposition rates vary with microclimate from the ground to the canopy in a tropical forest. *Ecosystems*. 22(6): 1206-1219. (Cover)
10. **Gora, E.M.**, **R.C. Kneale**, M. Larjavaara, and H.C. Muller-Landau. 2019. Dead wood necromass in a moist tropical forest: Stocks, fluxes, and spatiotemporal variability. *Ecosystems*. 22(6): 1189-1205.
9. **Gripshover, N.**, S.P. Yanoviak, and **E.M. Gora**. 2018. A functional comparison of swimming behavior in two temperate forest ants (*Camponotus pennsylvanicus* and *Formica subsericea*) (Hymenoptera: Formicidae). *Annals of the Entomological Society of America* 111(6): 319-325. doi: 10.1093/aesa/say026.
8. **Gora, E.M.**, E.J. Sayer, B.L. Turner, and E.V.J. Tanner. 2018. Decomposition of coarse woody debris in a long-term litter manipulation experiment: a focus on nutrient availability. *Functional Ecology* 32(4): 1128-1138. doi: 10.1111/1365-2435.13047.
7. **Gora, E.M.**, P.M. Bitzer, J.C. Burchfield, S.A. Schnitzer, and S.P. Yanoviak. 2017. Effects of lightning on trees: a predictive model based on *in situ* electrical resistivity. *Ecology and Evolution* 7: 8523–8534. doi: 10.1002/ece3.3347.
6. Lucas, J.M., **E.M. Gora**, and A. Alonso. 2017. A view of the global conservation job market and how to succeed in it. *Conservation Biology* 31(6): 1223-1231. doi: 10.1111/cobi.12949.

5. Yanoviak, S.P., **E.M. Gora**, J.M. Burchfield, P.M. Bitzer, and M. Detto. 2017. Quantification and identification of lightning damage in tropical forests. *Ecology and Evolution* 7(14): 5111-5122. doi: 10.1002/ece3.3095.
4. **Gora, E.M.**, N. Gripshover, and S.P. Yanoviak. 2016. Orientation at the water surface by the carpenter ant *Camponotus pennsylvanicus* (De Geer, 1773) (Hymenoptera: Formicidae). *Myrmecological News* 23: 33-39.
3. **Gora, E.M.** and S.P. Yanoviak. 2015. Electrical properties of temperate forest trees: a review and quantitative comparison with vines. *Canadian Journal of Forest Research* 45(3): 236-245, 10.1139/cjfr-2014-0380.
2. Yanoviak, S.P., **E.M. Gora**, J. Fredley, P.M. Bitzer, R.M. Muzika, and W.P. Carson. 2015. Direct effects of lightning in temperate forests: a review and preliminary survey in a hemlock-hardwood forest of the northern United States. *Canadian Journal of Forest Research* 45(10): 1258-1268. doi: 10.1139/cjfr-2015-0081.
1. **Gora, E.M.**, L.L. Battaglia, H. Schumacher, and W.P. Carson. 2014. Patterns of coarse woody debris volume among 18 late-successional and mature forest stands in Pennsylvania. *Journal of the Torrey Botanical Society* 141(2): 151-160. doi: 10.3159/TORREY-D-13-00066.1.

Manuscripts in Review (available on request)

1. **Gora, E.M.**, P.M. Bitzer, J.C. Burchfield, C. Gutierrez, and S.P. Yanoviak. *In review*. The contributions of lightning to biomass turnover, gap formation, and plant mortality in a tropical forest. *Ecology*

Manuscripts in Preparation (anticipated submission within 3 months)

1. **Gora, E.M.**, D. DeFilippis, and S.A. Schnitzer. *In prep*. Inferring drivers of liana mortality from associated patterns of tree death.

Non-refereed Publications

Gora, E.M. 2019. Dead wood in the canopy. *Functional Ecologists*

Gora, E.M. & A. Esquivel-Muelbert. 2021. What kills the largest trees in tropical forests? *Nature Ecology and Evolution Community: Behind the Paper*

GRANTS AND AWARDS

Funded

2020-2023	Smithsonian Earl S. Tupper Postdoctoral Fellowship Title: <i>Is resistance futile? Mechanisms of lightning-caused tree death and interspecific differences in survival</i> Advisors: Helene Muller-Landau and Allen Herre	\$202,200
2019-2020	Smithsonian ForestGEO Research Grant (Sole PI) Title: <i>Wood decomposition in species-rich tropical forests</i>	\$12,000
2018	Guy Stevenson Award "to the most outstanding graduating PhD university-wide"	
2018	Clay Memorial Scholarship	\$1,000
2017-2018	Graduate Research Internship, National Science Foundation	\$5,000

2016	Carl C. Cornett Entomological Fund Award	\$2,500
2016	Research Grant, UofL Graduate Network in Arts and Sciences	\$100
2015-2016	Young Explorer's Grant, National Geographic Society	\$4,750
2015-2016	Short-term Fellowship, Smithsonian Tropical Research Institute	\$8,000
2015-2018	Graduate Research Fellowship, National Science Foundation	\$138,000
2014-2018	University Graduate Fellowship, UofL (Partially Declined)	\$72,000
2015	Beechmont Garden Club Award	\$1000
2015	Research Grant, UofL Graduate Student Council	\$280
2015	Graduate Student Publication Award	\$150
2014	Carl C. Cornett Entomological Fund Award	\$2,500
2013	Honors Degree in Biology, University of Pittsburgh	
	Total funding:	\$449,480

TEACHING EXPERIENCE

Instructor

- 2019 Advanced Statistical Applications, University of Louisville (BIOL 671)
Full semester course in applied quantitative skills for late-stage PhD students
- 2019 Conservation Biology, University of Louisville (Co-Instructor) (BIOL 567)
Graduate/undergrad crossover course focusing on global change
- 2019 Intro-to-R Workshop, Smithsonian Tropical Research Institute
An intensive two-day workshop introducing programming in the R environment

Doctoral Student Committees

- Aaron Sexton, Department of Biology, University of Louisville, fall 2021 prospective graduation
- Kylea Garces, Department of Biology, University of Louisville, fall 2023 prospective graduation

Course Design and Tutoring

- 2015 Course Consultant for R programming, Experimental Design and Analysis
I helped redesign course curriculum in a graduate-level statistics course
- 2012-13 Group and Individual Tutor, University of Pittsburgh Athletic Department
I tutored ten student athletes in statistics, economics, and biology

Teaching Assistantship

- 2019 Tropical Field Biology, Iquitos, Peru (via University of Louisville)
- 2018 STRI R (Statistics) Workshop, Smithsonian Tropical Research Institute
- 2015 Principles of Biology Lab (BIOL 244), University of Louisville

Guest lectures (Graduate-level)

- 2020 *Geographic analyses of spatially structured and overdispersed data*, Biostatistics Working Group, Iowa State University

- 2020 *Conservation and forest disturbance*, Conservation Biology, Gustavus Adolphus College (BIO 245)
- 2019 *Disturbance in a tropical forest*, Experimental Tropical Biology, Arizona State University (BIO 494)
- 2017 *Disturbances and Lightning*, Organization for Tropical Studies Field Course
- 2017 *Lightning strikes on Barro Colorado Island*, UCSB Smithsonian Scholars
- 2016 *Lightning as an agent of tree mortality*, Organization for Tropical Studies Field Course
- 2015 *R programming within R Studio*, Experimental Design and Analysis, University of Louisville (BIOL 648)
- 2014 *Habitat Degradation and Air Pollution*, Conservation Biology, University of Louisville (BIOL 567)

MENTORSHIP

Undergraduate Mentorship

- 2019-2020 **Brady Parlato** – Beetle colonization of lightning struck trees
Outcomes: One publication, a senior thesis, and three presentations
- 2014-2018 **Noah Gripshover** – Orientation and kinematics of swimming ants
Outcomes: Two publications, three presentations, multiple awards
- 2015-2018 **Riley Kneale** – Factors that regulate wood decomposition
Outcomes: One publication, two presentations, two monetary awards
- 2013-2015 **Jen Fredley** – The ecological effects of lightning in temperate forests
Outcomes: One publication and poster presentation

Statistical consulting

- 2016-2019 *Four faculty members, 24 graduate students, and 14 undergraduates*

PROFESSIONAL PRESENTATIONS

Invited Seminars and Presentations

- 2021 **Gora, E.M.** Lightning as an agent of plant mortality and forest turnover. *Virtual Coffee on tropical forests* seminar series.
- 2020 **Gora, E.M.**, B. Parlato, J.C. Burchfield, P.M. Bitzer, S.P. Yanoviak. Mechanisms of lightning-initiated tree death in a tropical forest. *Ecological Society of America Annual Meeting 2020*. (Invited talk for a symposium)
- 2019 **Gora, E.M.** The shocking importance of lightning in tropical forests. *Tupper Seminar Series, Smithsonian Tropical Research Institute, Panama*.
- 2018 **Gora, E.M.** Take chances, persevere, and identify your ultimate goals. *Commencement Speaker, General Commencement Ceremony, University of Louisville*.

- 2018 **Gora, E.M.** Cherish your accomplishments and leverage your education to improve your community. *Commencement Speaker, Doctoral Hooding Ceremony, University of Louisville.*
- 2018 **Gora, E.M.** S.P. Yanoviak. Wood decomposition in a tropical forest: vertical patterns, microbial colonization, and the role of lightning. *Ecology and Evolutionary Biology Seminar Series, University of Pittsburgh.*
- 2017 **Gora, E.M.,** P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. Real-time location and quantification of lightning in a neotropical forest. *Invited presentation for the Xishuangbanna Scientific Delegation. Barro Colorado Island, Panama.*
- 2016 **Gora, E.M.,** S.P. Yanoviak. Lightning and its impact in a tropical forest. *Seminar Series, Smithsonian Center for Sustainability and Conservation.*
- 2015 **Gora, E.M.** Effects of lightning in a tropical forest. *Invited presentation for Matt Larsen, the Director of the Smithsonian Tropical Research Institute.*

Contributed Presentations

- 2019 **Gora, E.M.,** J.C. Burchfield, H.C. Muller-Landau, P.M. Bitzer, S.P. Yanoviak. Tropical lightning: effects on trees across landscapes and continents. *British Ecological Society Annual Meeting.*
- 2019 **Gora, E.M.,** J.C. Burchfield, H.C. Muller-Landau, P.M. Bitzer, S.P. Yanoviak. Lightning-caused disturbance across landscapes and ecosystems. *Ecological Society of America Annual Meeting.*
- 2018 **Gora, E.M.,** J.M. Lucas, S.P. Yanoviak. From the ground to a tropical forest canopy: Microbial community assembly and microclimate regulate decomposition. *Ecological Society of America Annual Meeting*
- 2018 **Gora, E.M.** Lightning and wood decomposition in a tropical forest. *Smithsonian Tropical Research Institute, Bambi Seminar Series.*
- 2017 **Gora, E.M.,** P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. Lightning is the primary cause of large tropical tree mortality. *Ecological Society of America Annual Meeting.*
- 2017 **Gora, E.M.,** P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. 2017. Lightning on BCI: Observations and quantification of effects on trees. *Forest Ecology Talk Series, Smithsonian Tropical Research Institute.*
- 2017 **Gora, E.M.,** P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. 2017. Lightning-caused tree mortality in a tropical forest. *Ecomunch Seminar Series, University of Oklahoma.*
- 2016 **Gora, E.M.,** P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. 2016. Why does lightning only kill some trees? A model-based approach. *Ecological Society of America Annual Meeting.*
- 2016 **Gora, E.M.** 2016. Dead wood stocks, fluxes, and patterns of decomposition. *Forest Ecology Talk Series, Smithsonian Tropical Research Institute.*

- 2016 **Gora, E.M.**, P.M. Bitzer, J.C. Burchfield, S.P. Yanoviak. Lightning on Barro Colorado Island: Tree characteristics influence lightning-tree interactions. *Smithsonian Tropical Research Institute, Bambi Seminar Series*.
- 2015 **Gora, E.M.**, N.D. Gripshover, S.P. Yanoviak. Orientation at the water surface by the carpenter ant *Camponotus pennsylvanicus*. *Kentucky Academy of Science Annual Meeting*.
- 2015 **Gora, E.M.**, S.P. Yanoviak. Lightning's impact on forest ecology. *Society of Integrative Comparative Biology Annual Meeting*.
- 2014 **Gora, E.M.**, S.P. Yanoviak. Lightning disturbance in forests. *Smithsonian Tropical Research Institute, Bambi Seminar Series*.
- 2014 **Gora, E.M.** S.P. Yanoviak. Lightning ecology and electrical resistivity of trees. *Kentucky Academy of Science Annual Conference*.
- 2014 **Gora, E.M.** S.P. Yanoviak. The Ecology of Lightning in a Northern Forest. *Midwest Ecology and Evolution Conference*.
- 2013 **Gora, E.M.**, S.P. Yanoviak, and M. Feil. Resistivity of trees and vines. *Kentucky Academy of Science Annual Conference*.
- 2013 **Gora, E.M.** Patterns of coarse woody debris volume among 18 late-successional and mature forest stands in Pennsylvania. *University of Pittsburgh, Honors Research Symposium*.

Presentations by Mentored Students

- 2019 Parlato, B.P., E.M. Gora, S.P. Yanoviak. Lightning damage facilitates beetle colonization of tropical trees. *Kentucky Academy of Science*.
- 2018 Kneale, R., **E.M. Gora**, S.P. Yanoviak. The role of ground contact in colonization and decomposition of dead wood. *Kentucky Organization of Field Stations Meeting*.
- 2017 Gripshover, N.D., **E.M. Gora**, S.P. Yanoviak. 2017. Swimming mechanisms of temperate forest ants (*Camponotus pennsylvanicus* and *Formica subsericea*). *Posters-at-the-Capitol, Frankfurt, Kentucky*.
- 2016 Kneale, R., **E.M. Gora**, S.P. Yanoviak. Factors influencing colonization of woody debris by saproxylic insects. *Kentucky Academy of Science*.
- 2016 Gripshover, N.D., **E.M. Gora**, S.P. Yanoviak. Biomechanics of water surface locomotion in temperate ants. *Kentucky Academy of Science*.
- 2016 Gripshover, N.D., **E.M. Gora**, S.P. Yanoviak. Biomechanics of water surface locomotion in temperate ants. *Summer Research Opportunity Program Symposium*.

INSTITUTIONAL AND PROFESSIONAL SERVICE

Institutional Committees and Service

- 2020 Judge for Bruell Student Presentation awards, ESA 2020 annual meeting
- 2019 Organizer of an Oral Session at the Ecological Society of America Meeting

- 2018 Researcher Administrative Representative, Smithsonian Tropical Research Institute
- 2018 Invited moderator, Round table on the conservation job market (U. of Pittsburgh)
- 2015-16 Researcher Administrative Representative, Smithsonian Tropical Research Institute
- 2016 Co-founder of the Barro Colorado Island Journal Club
- 2015 Research coordinator hiring committee, Smithsonian Tropical Research Institute
- 2014 Biology Department representative to the Graduate Student Union
- Society Membership:* Ecological Society of America, British Ecological Society, Kentucky Academy of Science

Community Outreach and Outreach Presentations

- 2020 Judge for Bruell Student Presentation awards, ESA 2020 annual meeting
- 2019 *Day of Science*, active learning modules about carbon cycling for middle schoolers
- 2018 *Carbon Cycling in a Tropical Forest*, Guides program STRI
- 2017 *Tropical Canopy Ecology*, ACCelerate Creativity and Innovation Festival
- 2016 Judge for the Kentucky State Science Fair competition – Middle School-level
- 2016 *Disturbance in forests*, Guides program Smithsonian Tropical Research Institute
- 2015 Coordination and review of research scholarships for Panamanian undergraduates
- 2015 Field trip organizer for insect collecting trips with the Jefferson County Public Schools
- 2007-14 Habitat for Humanity laborer with Snyder-Union, Pittsburgh, and Louisville chapters

Manuscript and Proposal Reviews

Journal Reviewer: Global Change Biology, Ecology, New Phytologist, Functional Ecology, Scientific Reports, Ecosystems, Oikos, Biogeochemistry, Forest Ecology and Management, Ecology and Evolution, Ecosphere, Plant and Soil, Acta Geochimica

Proposal reviewer: Smithsonian Tropical Research Institute, University of Louisville Biology Graduate Student Association

MEDIA EXPOSURE

- 2021 “How Will the Biggest Tropical Trees Respond to Climate Change?” – *Smithsonian Magazine*
- 2020 “Death by Lightning Is Common for Tropical Trees” – *Scientific American*
- 2020 “800 millions d’arbres tropicaux foudroyés chaque année” – *Universcience (Le Blob)*
- 2020 “Lightning strikes more than 100 million times per year in the tropics” – *NSF Research News*
- 2020 “Ka Boom” – *Smithsonian Tropical Research Institute News*
- 2020 “New study finds lightning destroys 832 million trees each year in tropics alone” – *The Weather Network*; reproduced by *Yahoo news, MSN*, and other online outlets

- 2020 “Lightning is silently killing trees – and it’s going to get worse” – *New Scientist*
- 2020 “Study of Tropical Forest Insects Leads to Discovery of Killer Lightning” – *Weather.com*
- 2019 “Lightning Discovered To Be Main Killer Of Tropical Trees” - *Forbes*
- 2019 “Millionen Regenwaldbäume sterben bei Gewittern” - *Deutschlandfunk*
- 2019 “Forest giants are the trees most at risk” – *Science*
--Reproduced in Kuwaiti science outlet *Al Oloom*
- 2018 “A&S student Evan Gora to speak at winter commencement” – *UofL Today*
- 2018 “Not all doom and gloom: Q&A with conservation job market researchers” - *Mongabay*
- 2018 “How Two Land-Dwelling Ant Species Paddle Through Water” – *Entomology Today*
- 2017 “Tallest Tropical Trees Died Mostly from Lightning” – *EOS*
- 2017 “Tallying the Tropical Toll on Trees from Lightning” – *Science*
- 2016 “I Think, Therefore I Explore” – *The Thinker*
- 2015 “Determined to Discover” – *University of Louisville Alumni Magazine*
- 2015 “Where Will Lightning Strike Next?” – *SICB Highlights*