Ray Dybzinski, PhD

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Overview

Academic Positions

2022-present	**Loyola University Chicago, School of Environmental Sustainability** Associate Professor
2015- 2022	**Loyola University Chicago, School of Environmental Sustainability** Assistant Professor
2011-2015	**Princeton University, High Meadows Environmental Institute, Dept. of Ecology & Evolutionary Biology** Associate Research Scholar working with Dr. Stephen Pacala
2014-2015	**Benedictine University, Department of Biology** Adjunct Professor
2013	**DePaul University, Department of Environmental Science & Studies** Adjunct Professor
2007-2011	**Princeton University, High Meadows Environmental Institute, Dept. of Ecology & Evolutionary Biology** Postdoctoral Researcher working with Dr. Stephen Pacala
2006-2007	**University of Minnesota, Howard Hughes Medical Institute "Numbers Count!" Project** Research Assistant working with Dr. Claudia Neuhauser
2003-2007	**University of Minnesota, Department of Ecology, Evolution, and Behavior** Research Assistant and Teaching Assistant working with Drs. David Tilman, Sarah Hobbie, Helene Muller-Landau, and Donald Alstad
2001-2002	**University of Illinois at Chicago, Department of Biology** Research Assistant working with Drs. Joel Brown and Hormoz BassiriRad
1996-1999	**Northern Illinois University, Department of Physics** Research Assistant working with Dr. Bogdan Dabrowski

Education

2007	**University of Minnesota, Minneapolis, Minnesota** PhD in Ecology, Committee: Dr. David Tilman (Advisor), C Neuhauser, S Hobbie, and C Bingham
1998	**Northern Illinois University, DeKalb, Illinois** BS in physics, BA in philosophy, Magna cum Laude

Teaching

Courses

2015-present	**Loyola University Chicago; ENVS280 Principles of Ecology** Developed entire course. Wrote custom 98-page e-Textbook "Understanding Ecology Through the Lens of Darwinian Fitness" to facilitate a "flipped" classroom. Taught entirely online in summers 2020 and 2021 due to Covid pandemic.
2015-present	**Loyola University Chicago; ENVS286/S Principles of Ecology Lab** Developed entire course in collaboration with SES colleagues. Wrote custom 33-page e-Textbook "Super-abbreviated Scientific Process, Experimental Design, Ecological Methods, & Statistical Analysis" to facilitate a "flipped" classroom. Collaborated with SES colleagues to develop a custom statistics assignment set using R statistical software. Taught partially online or "Hi-Flex" in spring 2020 and 2021 due to Covid pandemic.
2019, 2020	**Loyola University Chicago; ENVS401 Sustainable Systems: Natural and Life Sciences Perspectives** Developed entire course for which no archetypes exist. First core class for SES masters program surveying natural and life sciences knowledge in support of environmental, social, and economic sustainability. Taught two sections entirely online in fall 2020 due to Covid pandemic.
2018, 2021	**Loyola University Chicago; ENVS390 Integrative Seminar** Facilitated group and independent projects that drew on senior students' entire course of study

2017, 2022 **Loyola University Chicago; ENVS326 Agroecosystems**
Developed entire immersive 3-week course in which students built knowledge and skills in agriculture and ecology through hands-on work in greenhouse, laboratory, classroom, and field settings. Tours of area farms and remote meetings with sustainable agriculture institutes broadened perspectives.

2022 **Loyola University Chicago; ENVS3/425 Sustainable Agriculture**
Co-created course with SES Senior Sustainable Agriculture Manager Kevin Erickson. Dug deep on topics related to sustainable food production and sustainable food systems.

2014 **Benedictine University; BIOL364 Ecology Laboratory**
Led a course that taught advanced undergraduates about ecological thinking, data collection, statistics, and formal science writing.

2013 **DePaul University; ENV359 Ecological and Environmental Modeling**
Developed entire course that taught advanced undergraduates about common modeling approaches and culminated in independent projects related to each student's interests

Honors

2021 **Nominated for St. Ignatius of Loyola Excellence in Teaching Award, Loyola University Chicago**

2017 **Nominated for Faculty of the Year, Loyola University Chicago**

2017, 19 **Nominated for Langerbeck Faculty Mentor Award**

2003 **Award for Outstanding Performance as a Teaching Assistant**, U of Minnesota

2002-2003 **University of Minnesota Graduate Student Fellowship**

Invited Lectures

2019 Introduction to Mathematical Modeling in Environmental Science (lecture and guided activities over two 2.5 hour class sessions for LUC's ENVS286S)

2017, 18 Introduction to Ecology for First Star Scholars at-risk teens

2018, 19 "A meandering path from there to here" Environmental Careers and Professional Skills ENVS 200

2017 "The big picture on sustainable agriculture" STEP: Foods for Tania Schusler

2017 "The myth of the balance of nature – or – If a species is trashing the planet, why humans are the best-case scenario," Principles of Ecology Lecture for Brian Ohsowski

2017 "Speaking Green" panel discussion at Patagonia, downtown Chicago

2006 Mechanisms of Coexistence, given in Ecology for David Tilman

2005 Biodiversity and Invasions, given in Ecosystem Ecology for Sarah Hobbie

2005 Resource Competition, given in Ecology for Don Alstad

Graduate Research Projects Mentored

2020-present Matt Scott (Loyola University Chicago, Biology) – "Biotic Interactions and Distributions of Astragalus" Masters committee

2020- 2023 Jenna Drolen (Loyola University Chicago, School of Environmental Sustainability) – "Modeling Management-Relevant Urban Forest Stand Characteristics to Maximize Carbon Sequestration and Storage" Masters, Primary Advisor

2021- 2023 Natalia Szklaruk (Loyola University Chicago, School of Environmental Sustainability) – "Developing Sampling Methods and Guidelines for Macrophytes, Crayfish, Mollusks, and Other Aquatic Invertebrates in Illinois Waterbodies" Masters committee

2019- 2022 Kevin Erickson (Loyola University Chicago, School of Environmental Sustainability) – "Impact of soil lead-Pb level and phosphorus amendment rate on cannabinoid expression and Pb uptake in industrial hemp (*C. sativa* L.) inflorescence" Masters, Primary Advisor

2019- 2021 Lindsey Gohd (Northwestern University & Chicago Botanic Garden) – "Carbon sequestration relative to breadfruit domestication" Masters committee

2019- 2021 Carter Cranberg (Loyola University Chicago, School of Environmental Sustainability) – "Assessing Current Invasion Patterns of Crayfish and Macrophytes Within Cook and Lake Counties, Illinois" Masters committee

2019- 2021 Erin Kilbane (Loyola University Chicago, School of Environmental Sustainability) – "Modeling carbon allocation strategies for high-yielding perennial crops" Masters, Primary Advisor

2019- 2020 Lucas Chamberlain (Northwestern University & Chicago Botanic Garden) – "Quantifying soil carbon sequestration following the conversion of abandoned field to sustainable agriculture" Masters committee

Undergraduate Research Projects Mentored

2024 Madi Biesinger (Loyola University Chicago) – "Assessment of Photobiont Associations in Lichens of the Physciaceae Family" (presented at the The American Bryological and Lichenological Society annual meeting, West Portsmouth, Ohio)

2023 Iris Michael (Loyola University Chicago) – "Using Spent Coffee Grounds as Oyster Mushroom Substrate" (presented at the SES Climate Change Conference)

2022 Jeongwon Lee (The Bronx High School of Science) – "Analysis of Climate Sensitivity of Crop Pollinations: Game Theoretical Model for the Coexistence Dynamics of Anemophiles and Entomophiles in the Ecosystem and Agrosystem" (presented at the Junior Science and Humanities Symposium, New York City Metro)

2021 Natalie Taylor (Loyola University Chicago) – "Measuring Plant Nitrogen Availability in Forest Soils with Lab Incubations and Phytometer Growth Assays" (presented at the SES Climate Change Conference and at LUC Undergraduate Research & Engagement Symposium)

2020 Natalie Taylor and Megan Prosser (Loyola University Chicago) – "Empirical evidence of nitrogen, water, and phosphorus uptake as functions of fine root mass to inform next-generation terrestrial biosphere models" (presented at the LUC Weekend of Excellence (online))

2020 Isabelle Abbott (Loyola University Chicago) – "Ground-truthing particulate matter measurements in Chicago" (presented at the LUC Weekend of Excellence (online))

2019 Ella Segal (Rice University), Annalise Nordgren (DePaul University), and Rosemary Mascarenhas (Schaumburg High School) – "The Impacts of Fine Root Mass and Soil Nitrogen Availability on Nitrogen Uptake Rate in Trees" (co-advised with Dr. Meghan Midgley, Morton Arboretum)

2018 Teresa Dorado (Loyola University Chicago) – "Species diversity in urban areas: Landscape and rain gardens" (presented at New Horizons in Conservation Conference, Chicago, April 24-26, 2019)

2018 Samantha Guthman (Loyola University Chicago) – "Used coffee grounds as an alternative soil"

2017, 18 Angelo Kelvakis, Samantha Panock, Kanyarak Anuchitlertchon, Leah Vasarhelyi, Erin Kilbane, and Olivia Niosi (Loyola University Chicago) – "Improving models of global climate change: empirical determination of critical plant nitrogen uptake functions" (Poster presentation at IES Climate Change Conference, 2018)

2018 Angelo Kelvakis (Loyola University Chicago) – "Understanding the role of climate change and food insecurity in civil unrest" (Oral presentation at IES Climate Change Conference, 2018)

2018 Erin Kilbane & Andrew Landsem (Loyola University Chicago) – "Breeding perennial crops for sustainable agriculture" (Poster presentation at IES Climate Change Conference, 2018)

2017 Ellie Eccles (Loyola University Chicago) – "Growing mushrooms on soybean waste compost" (evolved into repurposing project taken over by Phoenix Bean, Chicago IL)

2017 Ainsley McGrath (Loyola University Chicago) – "Of Waffles, Pies, Planes, Trains, Teslas, and Trees"

2016 Ellicia Sanchez (Loyola University Chicago) – "Competitive root over-proliferation in common crop species"

2007 Allison Louthan (Grinnell College, IA) – "The effects of the tree canopy on seedling germination and establishment"

2006 Maria Jost (University of Puget Sound, WA) – "Soil enemy effects across an experimental biodiversity gradient"

2006 Samantha Hensley (Metropolitan State University, MN) – "Seedhead production across an experimental biodiversity gradient"

2005 David DeVetter (University of Minnesota, MN) – "Effects of oomycete removal on seedlings in prairie plots"

2005 Lynn Knutson (University of Minnesota, MN) – "*In situ* effects of natural enemies on seedling biomass across and experimental plant species diversity gradient"

2005 Amy Quandt (University of Puget Sound, WA), Erin Brault (Villanova University, PA), and Emily Brault (Villanova University, PA) – "Insect predation of *vicia villosa* at Cedar Creek"

2004 Carla Essenberg (University of Minnesota, MN), Leah Spellen (Oakwood College, AL), and Agwu Nnanna (Benedict College, SC) – "Biodiversity and invasion"

2004 Jodi-Ann Hudgson (Oakwood College, AL) – "The influence of plant species diversity on soil fertility"

2004 Kari Eichstaedt – Mentored through the College of Biological Sciences mentoring program. Kari subsequently earned her M.S. degree from the Department of Agronomy and Plant Genetics at the University of Minnesota

2003 Kathleen George (Benedict College, SC) – "Soil heterogeneity and species richness"

2003 Ja'Copo Wiggins (St. Augustine's College, NC) – "Selective granivory and the outcome of grass competition"

2003 Steph Swanson (Viterbo University, WI) and Jason Schatz (Iowa State University, IA) – "Effects of biodiversity on species invasion and success"

2003 Sarah Roley (Bemidji State University, MN) – "Effects of grasshopper herbivory on grass competition"

Teaching Supervision

2024 Madi Biesinger – SES undergraduate teaching assistant for ENVS 223

2023 Mary Clare Muehlemann – SES undergraduate teaching assistant for ENVS 223

2023 Max Henson – SES undergraduate teaching assistant for ENVS 286S taught at LUREC

2023 Gulnur Aytekin – SES undergraduate teaching assistant for ENVS 286

2022, 2023 Caitlin Aquila – SES undergraduate teaching assistant for ENVS 286/S at LSC and LUREC

2022 Jenna Drolen – SES graduate student teaching assistant for ENVS 326 at LUREC

2022 Kevin Erickson – Co-created a course with SES Senior Sustainable Agriculture Manager Kevin Erickson on Sustainable Agriculture and shared insights on pedagogy and class management

2021, 2022 Lily Paukstys – SES undergraduate teaching assistant for ENVS 286S, went on to become an adjunct instructor themself

2019, 2020 Erin Kilbane – SES undergraduate teaching assistant for ENVS 286S

2018 Olivia Niosi – SES undergraduate teaching assistant for ENVS 286S

2017 Mason Majszak – SES undergraduate teaching assistant for ENVS 286

2016 Aqsa Junagadhwala – SES undergraduate teaching assistant for ENVS 286

2015 Matt Bonfitto – Biology graduate teaching assistant for ENVS 286

Training

2021- 2022 Loyola University Chicago Anti-Racist Pedagogy Certificate Program (~32 hours of readings/videos paired with ~16 hours of synchronous class instruction, discussion, and activities)

2015- 2021 Loyola University Chicago Focus on Teaching and Learning, annual 1-day multi-session workshop/seminar

2021, 2022 Loyola University Chicago, Conducting Inclusive Searches

2020 Loyola University Chicago, Best Practices for Teaching Online ("OTC Bootcamp")

2017 LiCor Photosynthesis Training Course

2006 Preparing Future Faculty (3-credit class for graduate students and postdoctoral faculty focused on undergraduate teaching and learning, University of Minnesota)

2003 Center for Teaching and Learning, "Preparing Future Faculty" (Retreat, Minneapolis, MN)

2002 The Collaboration for the Advancement of College Teaching and Learning, "Prizing Diversity: Practical Approaches to Engagement in a Multicultural World" (Conference, Bloomington, MN)

Research

Publications

*contributed equally; *italics = students*

1. **Dybzinski, R.**, *E. Segal*, M. L. McCormack, C. R. Rollinson, *R. Mascarenhas*, *P. Giambuzzi*, *J. Rivera*, L. Fitzpatrick, *C. Wiggins*, and M. G. Midgley. 2024. Calculating Nitrogen Uptake Rates in Forests: Which Components Can Be Omitted, Simplified, or Taken from Trait Databases and Which Must Be Measured In Situ? Ecosystems.

2. *Drolen, J.*, L. Brandt, Y. Wei, and **R. Dybzinski**. 2023. Modeling Management-Relevant Urban Forest Stand Characteristics to Optimize Carbon Storage and Sequestration. Forests 14:2207.

3. Beckman, N. G. G.*, **R. Dybzinski***, and D. Tilman. 2023. Short-term plant-soil feedback experiment fails to predict outcome of competition observed in long-term field experiment. Ecology 104:e3883.

4. *Chamberlain, L. A.*, *T. Aguayo*, N. J. C. Zerega, **R. Dybzinski**, and L. M. Egerton-Warburton. 2022. Rapid improvement in soil health following the conversion of abandoned farm fields to annual or perennial agroecosystems. Frontiers in Sustainable Food Systems 6:1010298.

5. Weng, E., I. Aleinov, R. Singh, M. J. Puma, S. S. McDermid, N. Y. Kiang, M. Kelley, K. Wilcox, **R. Dybzinski**, C. E. Farrior, S. W. Pacala, and B. I. Cook. 2022. Modeling demographic-driven vegetation dynamics and ecosystem biogeochemical cycling in NASA GISS's Earth system model (ModelE-BiomeE v.1.0). Geoscientific Model Development 15:8153–8180.

6. Whitehead, S. R., G. F. Schneider, **R. Dybzinski**, A. S. Nelson, M. Gelambi, E. Jos, and N. G. Beckman. 2022. Fruits, frugivores, and the evolution of phytochemical diversity. Oikos

7. **Dybzinski, R**, *N Taylor*, *M Prosser*, *O Niosi*, *M Demo*, *E Kilbane*. 2021. Nitrogen, water, and phosphorus uptake as functions of fine-root mass in greenhouse microcosms of Poa pratensis. Plant Ecology 222(8): 977-991.

8. Hong, S, G Yin, S Piao, **R Dybzinski**, N Cong, X Li, K Wang, J Peñuelas, H Zeng, A Chen. 2020. Divergent responses of soil organic carbon to afforestation. Nature Sustainability 3:694-700.

9. Weng, E, **R Dybzinski**, CE Farrior, SW Pacala. 2019. Competition alters predicted forest carbon cycle responses to nitrogen availability and elevated CO2: simulations using an explicitly competitive, game-theoretic vegetation demographic model. Biogeosciences 16: 4577–4599.

10. **Dybzinski, R.**, *A. Kelvakis*, *J. McCabe*, *S. Panock*, *K. Anuchitlertchon*, *L. Vasarhelyi*, M. L. McCormack, G. G. McNickle, H. Poorter, C. Trinder, and C. E. Farrior. 2019. How are nitrogen availability, fine-root mass, and nitrogen uptake related empirically? Implications for models and theory. Global Change Biology 25:885–899.

11. Yan, T, T Qu, Z Sun, **R Dybzinski**, A Chen, X Yao, H Zeng, and S Piao. 2018. Negative effect of nitrogen addition on soil respiration dependent on stand age: Evidence from a 7-year field study of larch plantations in northern China. Agricultural and Forest Meteorology 262:24-33.

12. Weng, E, CE Farrior, **R Dybzinski**, SW Pacala. 2017. Predicting vegetation type through physiological and environmental interactions with leaf traits: evergreen and deciduous forests in an earth system modeling framework. Global Change Biology 23, 2482–2498.

13. Landrum, N, **R Dybzinski**, *A Smajlovic*, B M Ohsowski. 2016. Managing for Resilience: Lessons from Ecology. Journal of Management for Global Sustainability 3: 75-99.

14. Weng, E, S Malyshev, J W Lichstein, C E Farrior, **R Dybzinski**, T Zhang, E Shevliakova, S W Pacala. 2015. Scaling from individual trees to forests in an Earth system modeling framework using a mathematically tractable model of height-structured competition. Biogeosciences 12: 2655-2694. DOI:10.5194/bg-12-2655-2015

15. Farrior, C, I Rodriguez-Iturbe, **R Dybzinski**, S Levin, and S Pacala. 2015. Decreased water limitation under elevated CO 2 amplifies potential for forest carbon sinks. PNAS 112 DOI:10.1073/pnas.1506262112

16. **Dybzinski, R**, C E Farrior, and S W Pacala. 2015. Increased forest carbon storage with increased atmospheric CO2 despite nitrogen limitation: A game-theoretic allocation model for trees in competition for nitrogen and light. Global Change Biology 21. DOI:10.1111/gcb.12783

17. **Dybzinski*, R**, N Beckman*, and D Tilman. 2014. Neighborhoods have little effect on pre-dispersal fungal or insect seed predation in a grassland biodiversity experiment. Oecologia 174: 521–532. doi 10.1007/s00442-013-2788-3

18. Farrior, C E, D Tilman, **R Dybzinski**, P B Reich, and S W Pacala. 2013a. Resource limitation in a competitive context determines complex plant responses to experimental resource additions. Ecology 94: 2505–2517.

19. **Dybzinski, R**, C Farrior, S Ollinger, and S Pacala. 2013. Interspecific versus intraspecific patterns in leaf nitrogen of forest trees across nitrogen availability gradients. New Phytologist 200: 112-121. doi: 10.1111/nph.12353

20. Craine, J and **R Dybzinski**. 2013. Mechanisms of plant competition for nutrients, water and light. Functional Ecology 27: 833-840. doi: 10.1111/1365-2435.12081

21. **Dybzinski*, R** and G McNickle*. 2013. Game theory and plant ecology. Ecology Letters 16: 545-555. doi: 10.1111/ele.12071

22. Farrior, C, **R Dybzinski**, S Levin, and S Pacala. 2013b. Competition for water and light in closed-canopy forests: a tractable model of carbon allocation with implications for carbon sinks. The American Naturalist 181: 314-330. doi: 10.1086/669153 **(Faculty of 1000 Recommended and awarded the American Naturalist's Presidential Award for best paper of 2013)**

23. Franklin, O, J Johansson, R Dewar, U Dieckmann, R McMurtrie, Å Brännström, and **R Dybzinski**. 2012. Modeling carbon allocation in trees –a search for principles. Tree Physiology 32: 648-666. doi: 10.1093/treephys/tpr138

24. **Dybzinski, R** and D Tilman. 2012. Seed and microsite limitation in a late-successional old field: the effects of water, adults, litter, and small mammals on seeds and seedlings. Plant Ecology 213: 1003-1013. doi: 10.1007/s11258-012-0060-2

25. **Dybzinski, R**, C Farrior, A Wolf, P Reich, and S Pacala. 2011. Evolutionarily stable strategy carbon allocation to foliage, wood, and fine roots in trees competing for light and nitrogen: an analytically-tractable, individual-based model and quantitative comparisons to data. The American Naturalist 177: 153-166. doi: 10.1086/657992 **(Faculty of 1000 Recommended)**

26. **Dybzinski, R** and D Tilman. 2009. Competition and coexistence in plant communities. Pages 186-195 *in* S. A. Levin, editor. The Princeton Guide to Ecology. Princeton University Press, Princeton & Oxford.

27. **Dybzinski, R**, J Fargione, D Zak, D Fornara, and D Tilman. 2008. Soil fertility increases with plant species diversity in a long-term biodiversity experiment. Oecologia 158: 85-93.

28. **Dybzinski, R**, and D Tilman. 2007. Resource use patterns predict the long-term outcome of plant competition for nutrients and light. The American Naturalist 170: 305-318.

29. Fargione, J, D Tilman, **R Dybzinski**, J Hille Ris Lambers, C Clark, S Harpole, J Knops, PB Reich, and M Loreau. 2007. From selection to complementarity: Shifts in the causes of biodiversity-productivity relationships in a long-term biodiversity experiment. Proceedings of the Royal Society B: Biological Sciences 274: 871-876.

30. Tilman, D, J Hille Ris Lambers, S Harpole, **R Dybzinski**, J Fargione, C Clark, and C Lehman. 2004. Does metabolic theory apply to community ecology? It's a matter of scale. Ecology 85 (7): 1797-1799.

31. Dabrowski, B, L Gladczuk, A Wisniewski, Z Bukowski, **R Dybzinski**, A Szewczyk, M Gutowska, S Kolesnik, CW Kimball, and H Szymczak. 2000. Magnetostriction study of structural and magnetic transitions in La1–xSrxMnO3 (0.1<x<0.2). Jour. App. Phys. 87(6):3011-3017.

32. Klamut, PW, B Dabrowski, **R Dybzinski**, Z Bukowski, A Shengelaya, R Khasanov, S Dottinger, and H Keller. 2000. Muon-spin rotation study of the magnetic correlations in La2xCa1+xCu2O6+d superconductors. J. Appl. Phys. 87:5558-5560.

33. Dabrowski, B, **R Dybzinski**, Z Bukowski, O Chmaissem, JD Jorgensen. 1999. Oxygen content and structures of La1-xCaxMnO3+d as a function of synthesis conditions. Jour. Sol. St. Chem. 146:448-457.

34. Dabrowski, B, PW Klamut, Z Bukowski, **R Dybzinski** and JE Siewenie. 1999. Effective oxygen content and properties of La0.74Ca0.26MnO(3+d). J. Sol. State Chem. 144:461-466.

35. Dabrowski, B, X Xiong, Z Bukowski, **R Dybzinski**, PW Klamut, JE Siewenie, O Chmaissem, J Shaffer, CW Kimball, J Jorgensen, and S Short. 1999. Structure-properties phase diagram for La1-xSrxMnO3 (0.1-x-0.2). Phys. Rev. B 60:7006-7017.

36. Xiong, X, B Dabrowski, O Chmaissem, Z Bukowski, S Kolesnik, **R Dybzinski**, CW Kimball, and JD Jorgensen. 1999. Correlation between coherent Jahn-Teller distortion and magnetic spin orientation in La1-xSrxMnO3. Phys. Rev. B 60:10186-10192.

37. Dabrowski, B, K Rogacki, X Xiong, PW Klamut, **R Dybzinski**, and J Shaffer. 1998. Synthesis and properties of the vacancy-free La1-xBaxMnO3. Phys. Rev. B 58:2716-2723.

38. Shengelaya, A, CM Aegerter, S Romer, H Keller, PW Klamut, **R Dybzinski**, B Dabrowski, J Klamut, D Kaczorowski, and IM Savic. 1998. Muon-spin-rotation measurements of the penetration depth in YBa2Cu4O8 family superconductors. Phys. Rev. B 58:3457-3460.

Manuscripts in review *italics = students*

1. NA

Manuscripts in revision *italics = students*

1. *Kilbane, E*, T Crews, B Ohsowski, M Grillo, **Dybzinski, R**. Reject/Resubmit. Modeling carbon allocation strategies for high-yielding perennial crops. European Journal of Agronomy.

Manuscripts in preparation *italics = students*

1. **Dybzinski**, **R**, *E Segal*, *E Carroll*, ML McCormack, CR Rollinson, *R Mascarenhas*, *P Giambuzzi*, *J Rivera*, L Fitzpatrick, C Wiggins, MG Midgley. Interactions between fine root traits and nitrogen availability influence nitrogen uptake rates in monodominant temperate forest stands spanning taxa and mycorrhizal associations.

2. Zhang, T, E Weng, CE Farrior, **R Dybzinski**, S Malyshev, E Shevliakova, SW Pacala, RA Birdsey, JW Lichstein. In Prep. Effects of water limitation on tree carbon allocation in a competition- and demography-based vegetation model. For submission to New Phytologist.

Popular Media

The New York Times. 3 January 2011. "Competitive Nature That Is Nurtured in Soil" by Sindya N. Bhanoo

Grant Reviewer

National Science Foundation, NSF Long Term Ecological Studies, Department of Energy

Manuscript Reviewer

Biogeosciences, Biotropica, Canadian Journal of Botany, Ecological Modelling, Ecological Monographs, Ecological Research, Ecology, Ecology and Evolution, Ecology Letters, Ecosystems, European Journal of Soil Biology, Evolutionary Ecology, Forests, Frontiers Plant Science, International Journal of Plant Sciences, Journal of Ecology, Journal of Management for Global Sustainability, Journal of Plant Ecology, Nature Climate Change, Nature Plants, New Phytologist, Oecologia, Oikos, PNAS, The American Naturalist, The Ecological and Social Consequences of Changes in Biodiversity, The Journal of the Torrey Botanical Society, Theoretical Ecology, Trends in Ecology and Evolution

Funding

2023 **Dybzinski, R,** K Erickson, T Schusler, S Ku, M Conway, M Brito-Millán. **Building Partnerships Across the Chicago Food System to Support Food Enterprises, Increase Food Access, and Decrease Hunger.** Schreiber Venture Fund Innovation Grant. $99,552.

2021 **Dybzinski, R,** N Zerega, and L Egerton-Warburton. **Kurtis Kernza Ecosystem and Economic Services Study.** Kurtis Conservation Foundation. $15,000.

2020 Beckman, N, J Wright, **R Dybzinski**, and S Whitehead. **Collaborative Research: Diverse selective pressure on fruit chemical traits from mutualists and antagonists as a major driver of chemical evolution at the whole plant level**. NSF Division of Integrative Organismal Systems. Total request of $1,669,553, with $52,891 for LUC.

2020 **Dybzinski, R**. **Searle Online Course Development Grant**. Loyola SES. $4000.

2020 **Dybzinski, R. Final push to complete a body of work for a proposed global network of nitrogen uptake observations**. Loyola Research Support Grant. $4925.

2019 **Dybzinski, R** and M Midgley. **Using Morton Arboretum forestry plots to relate plant community nitrogen uptake rate, fine root traits, and nitrogen availability for insights into game theory and guidance for coupled C-N terrestrial biosphere models**. Morton Arboretum Center for Tree Science Fellowship. $14,978.

2019 **Dybzinski, R. How are phosphorus availability, fine-root mass, and phosphorus uptake related empirically? Implications for models and theory.** Loyola Research Support Grant. $4944.

2016 **Dybzinski, R. Moving critical empirical research in fossil carbon sequestrations and sustainable agriculture forward with a flexible game theoretic model of plant interactions.** Loyola Faculty Development Summer Research Stipend. $7000.

Professional Activities

Invited Talks

2022 "Forest productivity and carbon storage under climate change: A game-theoretic perspective" Loyola University Chicago Biology Department

2022 "Forest productivity and carbon storage under climate change: A game-theoretic perspective" University of Minnesota Duluth

2020 "Understanding the traits of plants in the context of global climate change and sustainable agriculture", Loyola University Chicago Biology Department (cancelled due to Covid-19 pandemic)

2019 "The Human Population Bottleneck and Conservation Reserves as Rewilding Centers", Teen Conservation Leadership Conference, Dominican University

2018 "The environmental impacts of the dominant modern food system", Loyola University Chicago Hunger Week Keynote Speaker

2018 "The myth of the balance of nature – or – If a species is trashing the planet, why humans are the best-case scenario", Teen Conservation Leadership Conference, IIT, IL

2017 "The myth of the balance of nature – or – If a species is trashing the planet, why humans are the best-case scenario", Teen Conservation Leadership Conference, IIT, IL

2017 UIC Biological Sciences undergraduates award day: Keynote Address, UIC, IL

2017 "From the greenhouse to the globe: some big surprises about how best to model nitrogen uptake in coupled CN Earth system models", Purdue University, IN

2017 "How gamey is your sink? Game theoretic versus conventional analyses of fossil carbon sequestration by forests", Purdue University, IN

2016 "Understanding the strategies of plants in the context of global change and sustainable agriculture", Loyola University Chicago, IL

2014 "Linking vital rates and traits in a generalized forest model", Ecological Society of Japan, Hiroshima

2014 "Thuggish, selfish trees and global climate change", Indiana University, IN

2013 "Trees as thugs and the fate of the land carbon sink", Illinois Institute of Technology, IL

2012 "Plants are heartless: incorporating an obvious, but frequently ignored fact in forestry models", Boston University, MA

2011 "The structure of plant communities across resource availability gradients: insights from physiologically-based, game-theoretic models of competition", Cary Institute of Ecosystem Studies in Millbrook, NY

2011 "The structure of plant communities across resource availability gradients: insights from physiologically-based, game-theoretic models of competition", University of Wisconsin at Milwaukee, WI

2011 "If a tree falls in a forest and no one is around to hear it, can I still model it?", Pennsylvania State University in State College, PA

2011 "The structure of plant communities across resource availability gradients: insights from physiologically-based, game-theoretic models of competition", University of Illinois at Chicago, IL

2010 "Understanding the competitive strategies of trees", Carleton College in Northfield, MN

2010 "Seeing the forest for the trees: Understanding community-level patterns by scaling up individual-level physiology in the context of light and nitrogen competition", Iowa State University in Ames, IA

2009 "Seeing the forest for the trees: Understanding community-level patterns by scaling up individual-level physiology in the context of light and nitrogen competition", Washington University in St. Louis, MO

2007 "Identifying the mechanisms that promote local plant species diversity in a tall grass community", Cedar Creek LTER, MN

2005 "Identifying the mechanisms that maintain plant species diversity", Augsburg College, MN

Presentations at Meetings *Italics = mentored students*

2024 *Biesinger, M.*, M. Nelsen, and **R. Dybzinski**. Assessment of Photobiont Associations in Lichens of the Physciaceae Family. (The American Bryological and Lichenological Society annual meeting, West Portsmouth, Ohio)

2022 **Dybzinski, R**. *E. Segal,* L. McCormack, M Midgley. Calculating nitrogen uptake rates in forests: which components can be omitted, simplified, or taken from trait databases and which must be measured in situ? (Ecological Society of America oral presentation, Montreal)

2022 M. L. McCormack, N. Tran, M. Lo, M. Midgley, **R. Dybzinski**, C. Rollinson, C. Cannon and E. Segal. Efficient root exploration strategies support greater whole-tree water use during summer drought. (AGU conference oral presentation, Chicago, IL)

2022 E. Weng, **R. Dybzinski**, C.E. Farrior, X. Xu, M. Detto, M.J. Puma, S.S. McDermid, B. Cook. Game-theoretic modeling of vegetation composition, structure, and dynamics: physical constraints, fundamental processes, and emergent properties. (AGU conference oral presentation, Chicago, IL)

2022 M.L. McCormack, M. Lo, N. Tran, C. Rollinson, **R. Dybzinski**, E. Segal, C. Cannon, M. Midgley, C. Rosenfeld, A. Hirons, C. Rigsby, K. Patrick. Highs and lows: fine-root strategies associated with tolerance to too much and too little water in urban trees. (Association of Applied Biologists oral presentation Rothamsted, UK)

2020 **Dybzinski, R**. M Midgley, ML McCormack, CR Rollinson, *E Segal, A Nordgren* and *R Mascarenhas*. Plant community nitrogen uptake rate is independent of fine root mass in established forests (Ecological Society of America (online) oral presentation, Louisville, KY)

2020 Newton Tran, M Lo, M Midgley, CR Rollinson, **R Dybzinski** and ML McCormack. Linking fine-root traits in shallow soils to sap flow reductions in response to mild drought among 7 temperate tree species (Ecological Society of America (online) oral presentation, Louisville, KY)

2019 **Dybzinski, R**. Fine root function and game theory (Ecological Society of America oral presentation, Louisville, KY)

2019 **Dybzinski, R**. The Human Population Bottleneck and Conservation Reserves as Rewilding Centers (Wild Things Conference of the Chicago Wilderness Alliance oral presentation, Rosemont, Illinois)

2018 E Weng, **R Dybzinski**, C. E. Farrior, S. W. Pacala. Competition alters predicted forest carbon cycle responses to nitrogen availability and elevated CO2: an analysis of game-theoretic modeling (oral presentation, AGU Conference, San Francisco)

2018 *A Kelvakis* and **R Dybzinski**. Civil Unrest Modeling in the face of Climate Change (Weekend of Excellence oral presentation, Loyola University Chicago)

2018 E Weng, **R Dybzinski**, C. E. Farrior, Y. Luo, N. Y. Kiang, S. W. Pacala. Terrestrial ecosystem modeling: from the linear system of pool-based models to the adaptive dynamics of vegetation demographic models (poster presentation, AGU Conference, San Francisco)

2018 *E Kilbane*, **R Dybzinski**, *A Landsem*. Perennial Legume Breeding For Use in Agriculture (Climate Change Conference & Weekend of Excellence poster presentation, Loyola University Chicago)

2018 *Panock, S, A Kelvakis, J. McCabe, L Vasarhelyi*, and **Dybzinski, R**. An empirical method for determining nitrogen uptake rate as a mathematical function of root mass and nitrogen availability (Climate Change Conference & Weekend of Excellence poster presentation, Loyola University Chicago)

2017 **Dybzinski, R**. Forest productivity and carbon storage under climate change: A game-theoretic perspective (Ecological Society of America oral presentation, Portland, OR)

2017 Rostamza, M, P Orlando, **R Dybzinski**, A Iyer-Pascuzzi, and G McNickle. The functional form of resource uptake and tissue cost equations have important implications for terrestrial net primary productivity (Ecological Society of America oral presentation, Portland, OR)

2017 **Dybzinski, R**. The myth of the balance of nature – or – If a species is trashing the planet, why humans are the best-case scenario (Wild Things Conference of the Chicago Wilderness Alliance oral presentation, UIC, Illinois)

2014 **Dybzinski, R**, B Sulman, C Farrior, and S Pacala. Beyond the transient: A simple model demonstrates that the rhizosphere priming effect can cause sustained increases in the nitrogen mineralization rate (Ecological Society of America poster presentation, Sacramento, CA)

2013 **Dybzinski, R**, C Farrior, and S Pacala. Additional carbon storage under elevated CO2 is not diminished – and may even be amplified – by nitrogen limitation (Ecological Society of America oral presentation, Minneapolis, MN)

2012 **Dybzinski, R**, C Farrior, and S Pacala. Untangling intraspecific and interspecific changes in leaf nitrogen across nitrogen availability gradients in forests (Ecological Society of America oral presentation, Portland, OR)

2012 Farrior, C, **R Dybzinski**, S Keel, and S Pacala. Competitive plant responses to elevated CO2 may significantly decrease a potential carbon sink (Ecological Society of America oral presentation, Portland, OR)

2011 **Dybzinski, R**, C Farrior, and S Pacala. Roots are weapons: Game theory of fine-root investment from a whole-plant perspective; theoretical predictions and empirical challenges (Ecological Society of America oral presentation, Austin, TX)

2011 Farrior, C, D Tilman, P Reich, **R Dybzinski**, and S Pacala. Evolutionarily stable strategies explain complex plant responses to simple resource addition experiments (Ecological Society of America oral presentation, Austin, TX)

2011 **Dybzinski, R**, C Farrior, A Wolf, P Reich, and S Pacala. Understanding the ecology of photosynthate allocation to leaves, roots, and stems in closed-canopy forests: insights from an individual-based, analytically-tractable mechanistic model of nitrogen and light competition and comparisons to data (Annual Symposium of the British Ecological Society oral presentation, University of Cambridge, UK)

2010 **Dybzinski, R**, C Farrior, A Wolf, P Reich, and S Pacala. ESS allocation to foliage, wood, and fine roots in trees competing for light and nitrogen: An analytically-tractable, individual-based model and quantitative comparisons to data (Ecological Society of America oral presentation, Pittsburgh, PA)

2010 Pacala, S, **R Dybzinski**, C Farrior, and E Shevliakova. Global consequences of competition for light, water, and nitrogen among individual plants (Ecological Society of America oral presentation, Pittsburgh, PA)

2010 Farrior, C, **R Dybzinski**, and S Pacala. Role of competition in vegetation change (Ecological Society of America oral presentation, Pittsburgh, PA)

2009 **Dybzinski, R**, C Farrior, and S Pacala. Forest structure and species interactions in an analytically-tractable, yet mechanistically-rich model of nitrogen and light competition (Ecological Society of America oral presentation, Albuquerque, NM)

2009 Farrior, C, **R Dybzinski**, S Levin, and S Pacala. Solving the tragedy of the commons for water use in plants (Ecological Society of America oral presentation, Albuquerque, NM)

2008 **Dybzinski, R** and D Tilman. Seed limitation aggravated by establishment limitation in an unsaturated late-successional old field: The effects of water, adults, litter, and small mammals on seeds and seedlings (Ecological Society of America oral presentation, Milwaukee, WI)

2007 **Dybzinski, R**, S Hensley, and D Tilman. A Janzen-Connell diversity-maintaining mechanism in temperate grasslands: Pre-dispersal seed predation by fungi and insects (Ecological Society of America oral presentation, San Jose, CA)

2007 **Dybzinski, R**, Patterns in the long-term Cedar Creek old-field data: Insights, speculations, and (most importantly) the case for more species trait data (Cedar Creek Long-Term Ecological Research Symposium oral presentation, Bethel, MN)

2007	**Dybzinski, R**, Mechanisms of establishment limitation in native prairie vegetation (Cedar Creek Long-Term Ecological Research Symposium oral presentation, St. Paul, MN)
2006	**Dybzinski, R**, J Fargione, and D Tilman. The fertility effect: resource supply increases across an experimental plant species diversity gradient (LTER All Scientists Meeting poster presentation, Estes Park, CO)
2006	**Dybzinski, R**, The effects of plant species diversity, seed predators, and their interaction on undispersed seeds (Cedar Creek Long-Term Ecological Research Symposium oral presentation, Bethel, MN)
2005	**Dybzinski, R**, Plant species coexistence and the effects of plant propagule dispersal, enemy dispersal, and enemy host-specificity in a spatially explicit Janzen-Connell model (Ecological Society of America oral presentation, Montreal, Canada)
2005	**Dybzinski, R**, Cedar Creek Overview (Long Term Ecological Research Network Graduate Student Meeting oral presentation, Andrews, OR)
2004	**Dybzinski, R**, D Tilman, Resource use patterns predict long-term plant competition outcomes (Ecological Society of America oral presentation, Portland, OR)
2004	**Dybzinski, R**, Resource use patterns predict long-term plant competition outcomes (Cedar Creek Long-Term Ecological Research Symposium oral presentation, Bethel, MN)
2003	**Dybzinski, R**, Coexistence and exclusion in a long term grass competition experiment, outcomes and possible mechanisms (Cedar Creek Long-Term Ecological Research Symposium oral presentation, Bethel, MN)
2002	**Dybzinski, R**, H BassiriRad, H Sehtiya, Negative effects of nitrate loading on the physiological responses of a nitrogen-fixing tree, *Robinia pseudoacacia* (Ecological Society of America poster presentation, Tucson, AZ)

Workshops

2018	**Sustainability Curriculum Consortium** Pittsburgh, Pennsylvania
2015	**Department of Energy Trait Modeling Workshop** Washington DC

Service

2022 – Present	**Graduate Studies Committee, member** School of Environmental Sustainability, Loyola University Chicago
2022 – Present	**Undergraduate Studies Committee, member** School of Environmental Sustainability, Loyola University Chicago
2019 – Present	**Graduate Committee, member** School of Environmental Sustainability, Loyola University Chicago
2023	**Brian Ohsowski Pre-Tenure Committee, member** School of Environmental Sustainability, Loyola University Chicago
2022	Participated in Rachel Leamon's ENVS 200 class on careers in academia
2022	Participated in a pitch about SES delivered to the LUC Board of Trustees
2022	**TT Environment & Human Health Search Committee, Chair** School of Environmental Sustainability, Loyola University Chicago
2016 – 2022	**Academic Council, member** School of Environmental Sustainability, Loyola University Chicago
2021	**Lab Manager Search Committee** (chair)
2021	**Laudati Sí Institution Committee** (member, led by Michael Schuck)
2020	**IES Searle Online Course Development – lab & field classes** (leader)
2020	**IES Searle Online Course Development – lecture-based classes** (member)
2020	**Judge for Loyola University Chicago Laudato Si Award**
2019	**NTT Soil and Chemistry Search Committee** (member)
2016, 17, 18, 23	**SES Fellowship Application Reviewer** School of Environmental Sustainability, Loyola University Chicago

2018	**LUREC BioBlitz** Led upland plant team for plant species identification
2018	**Good Food Fest** Tabled for Institute of Environmental Sustainability
2018	**IES Masters Degree Committee** (member)
2017	**Co-organized Ecological Society of America symposium "Ecological Lessons from Evolutionary Game Theory: Scaling from Functional Traits to Biodiversity and Ecosystem Services" with Gord McNickle (Purdue University)**
2017	**NTT Plant Ecologist Search Committee** (member)
2017	**All-Students-All-Science** Panelist for a forum on how undergraduates can get involved in research
2017	**Presidential Medallion Selection Committee**
2017	**Tabled for Institute of Environmental Sustainability at Loyola Academy (high school)**
2017	**Ecology Lab BS Committee** Institute of Environmental Sustainability, Loyola University Chicago
2016	**Founder and organizer of Odd-Tuesdays Sustainability Reading Club** Facilitate discussion of papers on sustainability with interested students
2016	**Long-Term Ecological Research (LTER) Synthesis Review** Reviewed proposals
2016	**Volunteer client for Statistical Consulting (Stat 401)** Loyola University Chicago
2016	**Search Committee: Instructor, NTT, 1-year** Institute of Environmental Sustainability, Loyola University Chicago
2016	**Organismal Curriculum Committee** Institute of Environmental Sustainability, Loyola University Chicago
2012-2015	**DePaul University Institutional Animal Care and Use Committee (IACUC)** Committee Member
2012-2015	**DePaul University Institute Biosafety Committee (IBC)** Committee Member
2006, 07	**College of Biological Sciences Teaching Assistant Award Committee (twice)** Reviewed nominees and voted to decide who would receive the award. I was invited to serve on this committee because I was a previous winner and had continued to demonstrate my capability and dedication as a TA.
2005-2006	**Graduate Student Seminar Series Organizer** Worked with a team of other graduate students to organize and run a weekly seminar series in the Ecology, Evolution, and Behavior Department. I was in charge of composing creative and informative emails and flyers to advertise the talks.
2005	**Cedar Creek Natural History Area Symposium Organizer** Worked with one other graduate student to organize and run an all-day seminar focused on research at Cedar Creek, with talks given by PI's, post-docs, and graduate students from around the country
2005	**Graduate Student "Welcome Weekend" Organizer** A faculty member and I organized a visit of approximately twenty prospective graduate students from around the country for meetings, activities, and socializing with the Ecology, Evolution, and Behavior Department
2003-2007	**Cedar Creek LTER-Network Graduate Student Representative** Liaison between the LTER Network office and the Cedar Creek graduate student community
2003-2006	**Cedar Creek Natural History Area Prescribed Burn Program** Helped control prescribed prairie and savanna burns
2003-2004	**Ecology, Evolution, and Behavior Graduate Student President**
2002 to 2003	**Ecology, Evolution, and Behavior Ethics and Aesthetics Committee Member** Organized six lectures and activities to stimulate thought and discussion on ethics and professional skills that were of interest to students and faculty in the department

Outreach

2023	**(B)earthday! celebration** Organized the SES talent show, performed, and ran sound for the event
2023	**Media interview** Interview with Chicago Health Magazine regarding environmental impacts of red meat

2023	**Media interview** Interview with Circular Visn for YouTube channel, https://www.youtube.com/watch?v=hymwk2ZVKNw
2022	Spoke with LUC student Grace Mooney about what makes food "sustainable" for her class project
2022	**Media interview** Interview with Hannah Houser for Phoenix regarding climate change and agriculture
2021	**Media interview** Interview with Alec Karam for Phoenix regarding climate change and autumn foliage
2018 - 2021	**Advocates for Urban Agriculture** Chair of the Outreach Committee, which raises awareness of urban agricultural issues in Chicago and organizes volunteer "Food Sovereignty Action Days" at Chicago community gardens
2021	**Media interview** Interview with Kristin Washagan at HappySprout regarding climate change and gardening
2020	**Media interview** Interview with Catherine Buchaniec at The Daily Northwestern regarding climate change and COVID19
2020	**Statistics outreach** Invited to speak about environmental statistics with the Mueller + Egerton-Warburton graduate students at Northwestern University and the Chicago Botanic Garden
2020	**Media interview** spoke with Adam Doster, a staff writer in University Marketing and Communication, about IES teaching on-line
2019	**Resilient Rogers Park** Spoke at a family-friendly climate protest
2019	**North Park Elementary School** Met with students to talk about the UN Sustainable Development Goals
2019	**Mighty Earth Rally speaker** Protesting McDonald's investment in industrial animal husbandry practices
2019	**Northwestern Science in Society** Provided constructive feedback and judging of Chicago-area high school science fair poster presentations
2019	**Loyola University Chicago ENVS203 statistics poster presentation judge**
2016, 17, 19, 22	**(B)earthday! celebration** Musical performances
2018	**Diversity in Environmental Sciences Jeopardy!** Faculty team contestant
2015-2018	**Helen Peirce International Studies Elementary School Science Fair Judge** Judged and provided feedback to fourth through eighth grade students who had conducted independent research
2008	**New Jersey High School Science Olympiad Supervisor** Created, administered, and scored an ecology test for 17 teams of regional high school students competing in the Science Olympiad
2006	**Hopkins Science Fair Judge** Judged and provided feedback to high school students who had conducted independent research related to the environment
2006	**Minnesota Academy of Science Undergraduate Oral Presentation Judge** Judged and provided feedback to undergraduates who had conducted independent research in the fields of Ecology and Macro Biology
2005	**Common X Change, K-12 Outreach** Participated in a program with the St. Paul Public Schools to pair scientists with K-12 teachers for lessons with K-12 students. I worked with a hydrologist and two SPPS teachers to construct a lesson plan that taught the water cycle, plant biology, and the scientific method to at risk 3rd and 4th grade students. We met with the students three times, once for an extended 4-hour lesson in the field.