

# Jonathan Paul Wilson

Endowed Professor of Environmental Biology & Professor of Environmental Studies, Haverford College  
370 Lancaster Ave., Haverford, PA 19041  
*Mobile:* (626) 325-8448 • *Email:* jwilson@haverford.edu

## Education

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<b>Harvard University</b> (Cambridge, Massachusetts) Ph.D., Earth and Planetary Sciences	2009
<b>Johns Hopkins University</b> (Baltimore, Maryland) B.A., Computer Science and Earth and Planetary Sciences	2003

## Academic Appointments

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Endowed Professor of Environmental Biology Professor of Environmental Studies Department of Environmental Studies, Haverford College	2024–Present
Associate Professor of Environmental Studies Department of Environmental Studies, Haverford College	2018–2024
Associate Professor of Biology and Environmental Studies Department of Environmental Studies, Haverford College Department of Biology, Haverford College	2018
Assistant Professor of Biology and Environmental Studies Department of Biology, Haverford College Department of Environmental Studies, Haverford College	2011–2018
Postdoctoral Scholar in Geobiology Division of Geological and Planetary Sciences, California Institute of Technology (Caltech)	2010–2011
O K Earl Postdoctoral Scholar in Geology Division of Geological and Planetary Sciences, Caltech	2009–2011

### Academic leadership positions:

Chair, Department of Environmental Studies, Haverford College	2019–2022
Director, Environmental Studies Program, Haverford College	2012–2013, 2016–2018

### Other appointments:

Research Associate National Museum of Natural History, Smithsonian Institution	2019–Present
Research Associate Department of Botany, Academy of Natural Sciences of Drexel University	2018–Present
Visiting Associate Professor of Geology Department of Geology, Colorado College	2018

## Peer-Reviewed Publications

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1. Jennifer C. McElwain, William J. Matthaeus, Catarina Barbosa, Christos Chondrogiannis, Katie O Dea, Bea Jackson, Antonietta Knetge, Kamilla Kwasniewska, Richard Nair, Joseph D. White, **Jonathan P. Wilson**,

Isabel P. Montanez, Yvonne M. Buckley, Sandra Nogué (2024). Functional traits of fossil plants. *New Phytologist*. <https://doi.org/10.1111/nph.19622>

2. **Jonathan P. Wilson**, Gabriel Oppler '17, Liz Reikowski '17, Jessica Smart '18, Charles Marquardt '16, Brian Keller '18 (2023). Physiological selectivity and plant-environment feedbacks during Middle and Late Pennsylvanian plant community transitions. *Geological Society, London, Special Publications*, v. 535(1). <https://doi.org/10.1144/SP535-2022-204>
3. William J. Matthaueus, Sophia I. Macarewich, Jon Richey, Isabel P. Montañez, Jennifer C. McElwain, Joseph D. White, **Jonathan P. Wilson**, Christopher J. Poulsen (2023). A systems approach to understanding how plants transformed Earth's environment in deep time. *Annual Review of Earth and Planetary Sciences*, v. 51(1), p. 551–580. <https://doi.org/10.1146/annurev-earth-080222-082017>
4. Martin Bouda, Brett A. Huggert, Kyra A. Prats, Jay W. Wason, **Jonathan P. Wilson**, Craig R. Brodersen (2022). Hydraulic failure as a primary driver of xylem network evolution in early vascular plants. *Science*, v. 378(6620), p. 642-646. <https://doi.org/10.1126/science.add2910>

Highlighted in: multiple media outlets and publications.

5. Mason A. Scher, Richard S. Barclay, Allison A. Baczynski, Bryton A. Smith, James Sappington, Lily Bennett '20, Suvankar Chakraborty, **Jonathan P. Wilson**, Patrick Megonigal, Scott L. Wing (2022). The effect of CO<sub>2</sub> concentration on carbon isotope discrimination during photosynthesis in *Ginkgo biloba*: implications for reconstructing atmospheric CO<sub>2</sub> levels in the geologic past. *Geochimica et Cosmochimica Acta*, v. 337, p. 82–94. <https://doi.org/10.1016/j.gca.2022.09.033>
6. William J. Matthaueus, Isabel P. Montañez, Jennifer C. McElwain, **Jonathan P. Wilson\***, Joseph D. White\* (2022). Stems matter: xylem physiological limits are an accessible and critical improvement to models of plant gas exchange in deep time. *Frontiers in Ecology and Evolution*, v. 10. <http://dx.doi.org/10.3389/fevo.2022.955066>

\*Denotes co-senior authorship.

7. William J. Matthaueus, Sophia I. Macarewich, Jon D. Richey, **Jonathan P. Wilson**, Jennifer C. McElwain, Isabel P. Montañez, William A. DiMichele, Michael T. Hren, Christopher J. Poulsen, Joseph D. White (2021). Freeze tolerance influenced forest cover and hydrology during the Pennsylvanian. *Proceedings of the National Academy of Sciences*, v. 118(42), e2025227118. <http://dx.doi.org/10.1073/pnas.2025227118>

Highlighted in: Howard J. Falcon-Lang (2021). Climate-vegetation models bring fossil forests back to life. *Proceedings of the National Academy of Sciences*, v. 118(44), e2116733118.

8. **Jonathan P. Wilson**, Joseph D. White, Isabel P. Montañez, William A. DiMichele, Jennifer C. McElwain, Christopher J. Poulsen, Michael T. Hren (2020). Carboniferous plants break the mold. *New Phytologist*, v. 227(3), p. 667–679. <http://dx.doi.org/10.1111/nph.16460>
9. Joseph D. White, Isabel P. Montañez, **Jonathan P. Wilson**, Christopher J. Poulsen, Jennifer C. McElwain, William A. DiMichele, Michael T. Hren, Sophia Macarewich, Jon D. Richey, and William J. Mattheus (2020). A process-based ecosystem model (Paleo-BGC) to simulate the dynamic response of Late Carboniferous plants to elevated O<sub>2</sub> and aridification. *American Journal of Science*, v. 320(7), p. 547–598.
10. Kadan Lottick, Silvia Susai, Sorelle A. Friedler, **Jonathan P. Wilson** (2019). Energy Usage Reports: Environmental awareness as part of algorithmic accountability. Workshop on Tackling Climate Change with Machine Learning at the 33<sup>rd</sup> Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver, Canada. <https://arxiv.org/abs/1911.08354v2>

Application of this research: [CodeCarbon.io](https://codecarbon.io), an open-source software package to measure the carbon dioxide emissions associated with machine learning.

Collaborators: Boston Consulting Group—Gamma, MILA, Comet.ml

11. Ruggero Vigliaturo, Damaris Kehrlí, Patxi Garra, Alain Dieterlen, Gwenaëlle Trouvé, Volker Dietze, **Jonathan P. Wilson**, and Reto Gieré (2019). Opaline phytoliths in *Miscanthus sinensis* and its cyclone ash from a biomass-combustion facility. *Industrial Crops and Products*, v. 139, 111539.

12. Mélanie Tanrattana, Jean-Francois Barczi, Anne-Laure Decombeix, Brigitte Meyer-Berthaud, **Jonathan P. Wilson** (2019). A new approach for modelling water transport in fossil plants. *IAWA Journal*, v. 40(3), p. 466–487.
13. **Jonathan P. Wilson**, Isabel P. Montañez, Joseph D. White, William A. DiMichele, Jennifer C. McElwain, Christopher J. Poulsen, Michael T. Hren (2017). Tansley Review: Dynamic Carboniferous tropical forests: new views of plant function and potential for physiological forcing of climate. *New Phytologist*, v. 215(4), p. 1333–1353.
14. Isabel P. Montañez, Jennifer C. McElwain, Christopher J. Poulsen, Joseph D. White, William A. DiMichele, **Jonathan P. Wilson**, Galen Griggs, Michael T. Hren (2016). Climate,  $pCO_2$ , and terrestrial carbon cycle linkages during late Palaeozoic glacial–interglacial cycles. *Nature Geoscience*, v. 9, p. 824–828.  
Highlighted in: Timothy S. Meyers (2016).  $CO_2$  and late Palaeozoic glaciation. *Nature Geoscience*, v. 9 p. 803–804.
15. **Jonathan P. Wilson** (2016). Hydraulics of *Psilophyton* and evolutionary trends in hydraulic conductivity after terrestrialization. *Review of Palaeobotany and Palynology*, v. 227 p. 65–76.
16. Jarmila Pittermann, **Jonathan P. Wilson**, Timothy J. Brodribb (2016). Plant water transport and clade diversification: Examples from extinct and extant taxa. *Encyclopedia of Evolutionary Biology*, v. 4 p. 358–366.
17. Jennifer C. McElwain, Isabel P. Montañez, Joseph D. White, **Jonathan P. Wilson**, Charilaos Yiotis (2016). Was atmospheric  $CO_2$  capped at 1000 p.p.m. over the past 300 million years? *Palaeogeography, Palaeoclimatology, Palaeoecology*, v. 444 (4) p. 653–658.
18. Elizabeth Trembath-Reichert, **Jonathan P. Wilson**, Shawn E. McGlynn, Woodward W. Fischer (2015). 400 million years of silica biomineralization in land plants. *Proceedings of the National Academy of Sciences*, v. 112 (17) p. 5449–5454.  
Highlighted in: Daniel J. Conley and Joanna C. Carey (2015). Silica cycling in geologic time. *Nature Geoscience*, v. 8 p. 431–432.
19. **Jonathan P. Wilson**, Joseph D. White, Jennifer C. McElwain, William DiMichele, Christopher Poulsen, Michael Hren, Isabel P. Montañez (2015). Reconstructing extinct plant water use for understanding vegetation-climate feedbacks: Methods, synthesis, and a case study using the Paleozoic Era medullosan seed ferns. *Paleontological Society Papers*, v. 21 p. 167–195.
20. **Jonathan P. Wilson** (2013). Modeling 400 million years of plant hydraulics. *Paleontological Society Papers*, v. 19 p. 1–20.
21. A. Hope Jahren, Brian A. Schubert, Leszek Marynowski and **Jonathan P. Wilson** (2013). The carbon isotope organic geochemistry of Early Ordovician rocks from the Annascaul Formation, County Kerry. *Irish Journal of Earth Sciences*, v. 31 p. 1–12.
22. Taylor S. Feild and **Jonathan P. Wilson** (2012). Evolutionary voyage of the angiosperm vessel: Comparative xylem hydraulic innovation and its significance for early angiosperm success. *International Journal of Plant Sciences*, v. 173 p. 596–609.
23. **Jonathan P. Wilson** and 11 others (2012). Deep-water incised valley deposits at the Ediacaran-Cambrian boundary in southern Namibia contain abundant *Treptichnus pedum*. *Palaios*, v. 27(4) p. 252–273.
24. **Jonathan P. Wilson** and Woodward W. Fischer (2011). Geochemical support for a climbing habit within the Paleozoic seed fern genus *Medullosa*. *International Journal of Plant Sciences*, v. 172(4) p. 586–598.
25. **Jonathan P. Wilson** and Woodward W. Fischer (2011). Hydraulics of *Asteroxylon mackieii*, an early Devonian vascular plant, and the early evolution of water transport tissue in terrestrial plants. *Geobiology*, v. 9 p. 121–130.
26. **Jonathan P. Wilson** and 18 others (2010). Geobiology of the Late Paleoproterozoic Duck Creek Formation, Western Australia. *Precambrian Research*, v. 179(1-4) p. 135–149.

27. **Jonathan P. Wilson** and Andrew H. Knoll (2010). A physiologically explicit morphospace for tracheid-based water transport in modern and extinct seed plants. *Paleobiology*, v. 36(2) p. 335–355.
28. **Jonathan P. Wilson**, Andrew H. Knoll, N. Michele Holbrook, Charles R. Marshall (2008). Modeling fluid flow in *Medullosa*, an anatomically unusual Carboniferous seed plant. *Paleobiology*, v. 34(4) p. 472–493.
29. P. Cohen, A. Bradley, A. H. Knoll, J. P. Grotzinger, S. Jensen, J. Abelson, K. Hand, G. Love, J. Metz, N. McLoughlin, P. Meister, R. Shepard, M. Tice, **Jonathan P. Wilson** (2009). Tubular Compression Fossils from the Ediacaran Nama Group, Namibia. *Journal of Paleontology*, v. 83(1) p. 110–122.

*Manuscripts in revision, review, or preparation:*

30. Jarmila Pittermann, Scott McAdam, **Jonathan P. Wilson**, Christine Scoffoni. Evolution of cavitation and pit membrane structure. Manuscript in preparation.
31. Sophia I. Macarewich, Christopher J. Poulsen, William J. Matthaues, Jon D. Richey, Joseph D. White, Isabel P. Montañez, William A. DiMichele, Michael T. Hren, Jennifer C. McElwain, **Jonathan P. Wilson**. Ecosystem-to-global scale modeling of vegetation-climate feedbacks during the Late Paleozoic Ice Age with fossil-based plant functional types. Manuscript in preparation.
32. **Jonathan P. Wilson**, Gregory Miraglia, Woodward W. Fischer. Physiological limits of the Gondwanan seed plant *Glossopteris* and Permian-Triassic extinction selectivity on land. Manuscript in preparation.
33. **Jonathan P. Wilson**, Mallory Kastner '21, James Dougherty '21, Richard S. Barclay, Bryton A. Smith, James Sappington, Lily Bennett '20, Ben Lloyd, Patrick Megonigal, Scott L. Wing. Minimal biochemical adaption to elevated CO<sub>2</sub> in *Ginkgo biloba* trees, saplings, and seedlings: results from the Fossil Atmospheres experiment and implications for reconstructing atmospheric CO<sub>2</sub> levels in the geologic past. Manuscript in preparation.

*Peer-reviewed book reviews, correspondence, and other publications:*

34. **Jonathan P. Wilson** (2009). Green Life Through Time: Review of Taylor, Taylor, and Krings' *Paleobotany: The Biology and Evolution of Fossil Plants*, 2nd ed. *Science*, v. 325 p. 36.
35. Jennifer C. McElwain, Isabel P. Montañez, Joseph D. White, **Jonathan P. Wilson**, Charilaos Yiotis (2017). Reply to comment on "Was atmospheric CO<sub>2</sub> capped at 1000 p.p.m. over the past 300 million years?" *Palaeogeography, Palaeoclimatology, Palaeoecology*.

## Leadership Positions

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**Elected leadership positions:** Faculty Representative to the Haverford College Board of Managers (2019–2021); Alternate to Academic Council, the promotion and tenure committee (2019–2020; 2020–2021); Chair, Faculty Affairs and Planning Committee, the faculty leadership committee (2019–2021)

**Selected accomplishments:** *Led the largest committee restructure in more than thirty years to increase faculty governance and reduce overall faculty service and achieved unanimous consensus; designed and implemented an equitable parental leave policy for faculty and staff; revised the charge of the student disciplinary committee to add a second focus on student support; helped coordinate faculty response to the Covid-19 pandemic; helped resolve a student strike for racial justice that made national news.*

**Appointed leadership positions:** Faculty-Staff Covid-19 Academic Continuity Presidential Advisory Group (2020–2021); Bi-College Covid-19 Continuity Planning Group (2020–2021); Honorary Degrees Committee (2019–2021); Working Group on Benefits (2019–2021)

## Grant Support and Awards

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**Co-PI: National Science Foundation (NSF) grant, Sedimentary Geology and Paleobiology** 2024–2027  
 "Cells to ecosystems: fossil xylem is the missing link in reconstructing water use by plants, forests, and global vegetation in deep time"

<i>(EAR 2323169: \$600,000 total, \$251,000 research grant to Wilson)</i>	2018–2022
<b>Co-PI: National Science Foundation (NSF) grant, Paleo Perspectives on Climate Change:</b> “Collaborative Research: New Estimates of Atmospheric pCO <sub>2</sub> through the Paleocene-Eocene” <i>(EAR 1804974: \$783,000 total, \$112,000 research grant to Wilson)</i>	
Center for Peace and Global Citizenship, Koshland Integrated Natural Science Center: Study Tour–Field Botany in Trinidad and Tobago <i>(\$29,000 grant for undergraduate research travel)</i>	2022
Tri-Co Philadelphia Engagement Grant	2020
Responsible Computer Science Challenge, Mozilla Foundation	2019
Diversity and Inclusion Course Development Grant	2019
Center for Peace and Global Citizenship, Koshland Integrated Natural Science Center: Study Tour–Field Botany in Trinidad and Tobago <i>(\$27,000 grant for undergraduate research travel)</i>	2019
<b>The Lindback Distinguished Teaching Award, Christian R. and Mary F. Lindback Foundation</b> <i>(Award for teaching excellence given to one faculty member every other year)</i>	2018
Kavli Fellow: National Academy of Sciences and Alexander von Humboldt Foundation <i>(One of 30 American scientists selected for the Japanese-American-German Fellowship of Science by the National Academy of Sciences)</i>	2017
Center for Peace and Global Citizenship, Koshland Integrated Natural Science Center, Hurford Humanities Center: Study Tour–Field Botany in Trinidad and Tobago <i>(\$29,000 grant for undergraduate research travel)</i>	2017
Koshland Integrated Natural Science Center <i>(\$6,000 grant for undergraduate research travel)</i>	2017
Microbiome Research Award: <i>Ficus</i> Phyllospheres, Nigeria and United States <i>(\$100,000 research grant)</i>	2016
Center for Peace and Global Citizenship, Koshland Integrated Natural Science Center: Study Tour–Field Botany in Trinidad and Tobago <i>(\$27,000 grant for undergraduate research travel)</i>	2016
LI-COR Environmental Education Fund Award <i>(\$30,000 research grant; \$30,000 equipment grant)</i>	2012
San Andreas Visiting Fellow, The Huntington Library, Art Collections, and Botanical Gardens	2010–2011
Deland Award for Research, Arnold Arboretum	2008
Geological Society of America Travel Award	2008
International Organisation of Palaeobotany Travel Award	2008
Certificates of Distinguished Teaching, Harvard University	2005, 2006, 2007

### **Selected Professional Activities**

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**Contributing Scientist:** [CodeCarbon.io](https://codecarbon.io), an open-source software package to measure the carbon dioxide emissions associated with machine learning. Collaborators: Boston Consulting Group—Gamma, MILA, Comet.ml

**Conference Session Co-organizer:** North American Paleontological Congress (2019); European Palaeobotany and Palynological Congress (2018); Geological Society of America (2017, 2014); Botanical Society of America (2016); International Organisation of Palaeobotany Congress, Salvador, Brazil (2016)

**Referee:** *American Journal of Botany; Annals of Botany; Carnets de Géologie: Notebooks on Geology; Functional Ecology; Geobiology; Geochimica et Cosmochimica Acta; Gondwanan Research; International Association of Wood Anatomists (IAWA) Journal; International Journal of Plant Sciences; New Phytologist; Palaeogeography, Palaeoclimatology, Palaeoecology; Palaios; Paleobiology; Paleontological Society Papers; Precambrian Research; Proceedings of the National Academy of Sciences; Review of Palaeobotany and Palynology; Science; Science of the Total Environment*

## Regional Education Contact, Paleontological Society

### Professional Talks (*denotes keynote*, *\* denotes invited talk*, *denotes undergraduate student*)

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2024:

1. **Jonathan P. Wilson**. Evolution, environment, drought, frost: insights from extinct and living plants. Department of Biology, Drexel University, Philadelphia, PA.
2. **Jonathan P. Wilson**. Plant paleoecophysiology traits in deep time: hydraulic conductivity and drought resistance in late Carboniferous Period plants. European Geophysical Union, Vienna, Austria
3. **Jonathan P. Wilson\***. Plant-environment dynamics of Carboniferous and Permian floras. Philadelphia Botanical Club, Philadelphia, PA.
4. **Jonathan P. Wilson\***. Evolution, environment, drought, frost: insights from extinct and living plants. Department of Biology, Villanova University, Villanova, PA.
5. **Jonathan P. Wilson\***. Evolution, environment, climate: insights from extinct and living plants. Isaac Sharpless Inn at Court, Wilmington, DE.

2023:

6. **Jonathan P. Wilson**. Evolution, extinction, drought, frost: investigating vegetation-climate feedbacks using plant paleoecophysiology and the fossil record. 2023 Mid-Atlantic Geobiology Conference, University of Delaware.
7. **Jonathan P. Wilson\***. Evolution, environment, climate: insights from extinct and living plants. Delaware Valley Paleontological Society, Philadelphia, PA.
8. **Jonathan P. Wilson\***. 450 million years of novelty and convergence: a history of plant evolution. Haverford College Arboretum.
9. **Jonathan P. Wilson\***. A guided tour of plant evolution. Science on Tap, Phoenixville, PA.
10. **Jonathan P. Wilson\***. Evolution, environment, climate: insights from extinct and living plants. Haverford College Arboretum.

2022:

11. Stephanie Zukerman, **Jonathan P. Wilson\***. Botany, culture, and history in Trinidad and Tobago: a multidisciplinary field study. Pennsylvania Council for International Education Annual Conference.

2021:

12. **Jonathan P. Wilson\***. Form, function, and plant paleoecophysiology during the Kasimovian. Workshop on Carboniferous Period, International Commission on Stratigraphy.
13. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. University of Leicester, Leicester, U.K..

2019:

14. **Jonathan P. Wilson\***. Hydraulic conductivity and constraints among Paleozoic plants. North American Paleontological Congress, Riverside, CA.

2018:

15. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. University of Pennsylvania, Philadelphia, PA.
16. **Jonathan P. Wilson\***. Evolution of silica biomineralization in terrestrial plants. University of Pennsylvania, Philadelphia, PA.
17. **Jonathan P. Wilson\***. Ecophysiology of extinct plants. Smithsonian Botanical Symposium, Washington, D.C.

18. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. Academy of Natural Sciences, Philadelphia, PA.
19. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. Department of Geology, Colorado College.
20. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. Department of Geosciences, Baylor University.
21. **Jonathan P. Wilson\***. Paleoenvironmental insights from the structure and function of extinct plants. Smith Lecture, Department of Earth and Environmental Sciences, University of Michigan.

2017:

22. **Jonathan P. Wilson\***. Reanimating extinct plants. Delivered at Japanese–American–German Frontiers of Science symposium, Bad-Neuenahr, Germany.
23. **Jonathan P. Wilson**, Elizabeth Trembath-Reichert, Shawn E. McGlynn, Woodward W. Fischer. A geobiological perspective on the evolution of silica biomineralization in plants. Delivered at Annual Meeting of the Geological Society of America, Seattle, WA.
24. **Jonathan P. Wilson\***. Structure and function in extinct plants: the early history of water transport. Institute of Earth, Ocean, and Atmospheric Sciences, Rutgers University.
25. **Jonathan P. Wilson\***. Structure and function in extinct plants: the early history of water transport. Department of Biology, Humboldt State University.

2016:

3. **Jonathan P. Wilson\***, Remmy Chen, Charles Marquardt, Gregory M. Miraglia, Deana Rauh, Gabriel Oppler, Elizabeth Reikowski. Hydraulic variability among Paleozoic plants: convergence, coordination, and conundrums. Delivered at XIV International Organisation of Palaeobotany Congress, Salvador, Brazil.
4. **Jonathan P. Wilson\***, Isabel P. Montañez, Joseph D. White, Jennifer C. McElwain, William A. DiMichele, Christopher J. Poulsen, Michael T. Hren. Structure and function in the dynamic Carboniferous tropical forests: a new perspective on Paleozoic plant function and physiological forcing of climate. Delivered at Annual Meeting of the Geological Society of America, Denver, CO.
5. **Jonathan P. Wilson\***. Modeling and quantification of vascular networks. Gordon Conference on Multiscale Plant Vascular Biology, Newry, ME.
6. **Jonathan P. Wilson\***, Elizabeth Trembath-Reichert, Shawn E. McGlynn, Woodward W. Fischer. A molecular and geobiological perspective on the evolution of plant biomineralization. Delivered at Annual Meeting of the Botanical Society of America, Savannah, GA.
7. **Jonathan P. Wilson\***. Great adaptations and mass extinctions: evolutionary insights from the physiology of extinct plants. Colorado College.
8. **Jonathan P. Wilson\***. Great adaptations and mass extinctions: evolutionary insights from the physiology of extinct plants. Franklin and Marshall College.

2015:

10. **Jonathan P. Wilson\***. Reconstructing the physiology and biomechanics of extinct plants. 8<sup>th</sup> Plant Biomechanics Meeting, Nagoya, Japan.
11. **Jonathan P. Wilson\***. Unconventional approaches to the study of extinct plants: case studies in the evolution of water transport and silica biomineralization. Ecosystems Center, Marine Biological Laboratory, Woods Hole, MA.
12. **Jonathan P. Wilson\***. Unconventional approaches to the study of extinct plants: case studies in the evolution of water transport and silica biomineralization. Department of Biology, University of Pennsylvania.

13. **Jonathan P. Wilson\***, Brigitte Meyer-Berthaud, Evan Walser-Kuntz. Water transport and biogeography of the Late Devonian tree, *Archaeopteris (Callixylon)*. Delivered at Annual Meeting of the Geological Society of America, Baltimore, MD.
14. **Jonathan P. Wilson\***, Joseph D. White, Jennifer C. McElwain, William A. DiMichele, Christopher J. Poulsen, Michael T. Hren, Isabel P. Montañez. Reconstructing extinct plant water use for understanding vegetation-climate feedbacks: Methods, synthesis, and a case study using the Paleozoic Era medullosan seed ferns. Delivered at Annual Meeting of the Geological Society of America, Baltimore, MD.
15. **Jonathan P. Wilson\***. Great adaptations and mass extinctions: evolutionary insights from the physiology of extinct plants. BotAnique et bioinforMatique de l'Architecture des Plantes (AMAP), Montpellier, France.
16. **Jonathan P. Wilson\***. Great adaptations and mass extinctions: evolutionary insights from the physiology of extinct plants. Department of Integrative Biology, University of California, Berkeley.

2014:

16. **Jonathan P. Wilson**, Gregory M. Miraglia, Woodward W. Fischer. Physiology of *Glossopteris*, a circumpolar seed plant from the Permian Period, and implications for the terrestrial record of the Permian-Triassic mass extinction. Delivered at Annual Meeting of the Geological Society of America, Vancouver, BC.
17. **Jonathan P. Wilson\***. Mass extinctions and great adaptations: evolutionary insights from the study of extinct plants. Department of Biology, St. Joseph's University.
18. **Jonathan P. Wilson\***. Hydraulic strategies in early-diverging vascular plants and seed plants. Delivered at the 9<sup>th</sup> European Palaeobotany and Palynology Conference, Padua, Italy.
19. **Jonathan P. Wilson\***. Ecological and evolutionary insights from the study of fossil plants. Department of Ecological and Evolutionary Biology, University of Connecticut.

2013:

20. **Jonathan P. Wilson\***. Modeling 400 million years of plant hydraulics. Delivered at Annual Meeting of the Geological Society of America, Denver, CO.
21. **Jonathan P. Wilson\***. A geobiological perspective on the evolutionary history of silicon accumulation in terrestrial plants. Department of Paleobiology, Smithsonian Institution.

2012:

22. **Jonathan P. Wilson\***. Mathematical and geochemical approaches to the physiology and biomechanics of Paleozoic plants. Delivered at 13<sup>th</sup> Annual International Organisation of Palaeobotany Congress, Tokyo, Japan.
23. **Jonathan P. Wilson\***. Mathematical and geochemical approaches to the physiology and biomechanics of Paleozoic plants. Department of Biology, University of Pennsylvania.

2011:

24. **Jonathan P. Wilson\***. 400 million years of plant hydraulics. Department of Plant Biology, University of Pennsylvania.
25. **Jonathan P. Wilson\***. Ecological and evolutionary insights from the study of fossil plants. Department of Biology, Bryn Mawr College.
26. **Jonathan P. Wilson\***. 400 million years of plant hydraulics. Rancho Santa Ana Botanic Garden, Claremont, CA.
27. **Jonathan P. Wilson\***. Environmental and evolutionary insights from the study of fossil plants. Department of Geological and Environmental Sciences, Stanford University.
28. **Jonathan P. Wilson\***, Woodward W. Fischer. Physiological limits of the Late Paleozoic seed plant *Glossopteris* and selectivity during the Permian-Triassic mass extinction. Delivered at 8<sup>th</sup> Annual Southern California Geobiology Symposium, Los Angeles, CA.

2010:

29. **Jonathan P. Wilson\***. Reconstructing environmental history through the physiology of fossil plants. Jet Propulsion Laboratory, Pasadena, CA.



30. **Jonathan P. Wilson\***. Ecological and evolutionary insights from the physiology of fossil plants. Department of Biology, Haverford College.
31. **Jonathan P. Wilson\*** and Woodward W. Fischer. Geochemical support for a climbing habit in the Paleozoic seed fern genus Medullosa. Delivered at Annual Meeting of the Geological Society of America, Denver, CO.
32. **Jonathan P. Wilson\***. Ecological and evolutionary insights from the physiology of fossil plants. Division of Geological and Planetary Sciences, Caltech.
33. **Jonathan P. Wilson\***. Ecological insights from the physiology of fossil plants. Department of Earth and Planetary Sciences, Washington University in St. Louis.

2005–2009:

34. **Jonathan P. Wilson\***. Reanimating extinct plants. Public lecture for Science for the Public, Boston, MA. (2009)
35. **Jonathan P. Wilson\***. Reconstructing the physiology of extinct plants using mathematical modeling. Biological Networks Modeling Center, Caltech. (2009)
36. **Jonathan P. Wilson\***. Estimating fossil plant crown size using scaling laws. Delivered at 2009 Leaf Summit, Smithsonian Institution. (2009)
37. **Jonathan P. Wilson\***. Reconstructing the physiology of extinct plants. Department of Paleobiology, Smithsonian Institution. (2009)
38. **Jonathan P. Wilson\***. Reconstructing the physiology of extinct plants. Department of Earth Sciences, Oxford University. (2009)
39. **Jonathan P. Wilson\***. Reconstructing the physiology of extinct plants. CIRAD AMAP: botAnique et bioinforMatique de l'Architecture des Plantes, Montpellier, France. (2008)
40. **Jonathan P. Wilson\***, A. H. Knoll, N. M. Holbrook. Hydraulics of Medullosa, an anatomically unusual Carboniferous seed plant. Delivered at International Organisation of Palaeobotany Congress VIII, Bonn, Germany. (2008)
41. **Jonathan P. Wilson**. A model for assimilation and transpiration in fossil plants. Delivered at Annual Meeting of the Geological Society of America, Houston, TX. (2008)
42. **Jonathan P. Wilson**, N. M. Holbrook, A. H. Knoll. A physiological interpretation of the Late Paleozoic seed plant Medullosa. Delivered at Annual Meeting of the Botanical Society of America, Chicago, IL. (2007)
43. **Jonathan P. Wilson**, A. H. Knoll. A physiologically explicit morphospace for water transport in vascular plants. Delivered at Annual Meeting of the Geological Society of America, Philadelphia, PA. (2006)
44. **Jonathan P. Wilson**, N. M. Holbrook, C. R. Marshall, A. H. Knoll. Modeling fluid flow in an extinct seed plant. Delivered at Annual Meeting of the Geological Society of America, Salt Lake City, UT. (2005)

## Selected Posters

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1. Kadan Lottick, Silvia Susai, Sorelle A. Friedler, **Jonathan P. Wilson**. Energy Usage Reports: Environmental awareness as part of algorithmic accountability. Workshop on Tackling Climate Change with Machine Learning at the 33<sup>rd</sup> Conference on Neural Information Processing Systems (NeurIPS 2019), Vancouver, Canada. (2019)
2. **Jonathan P. Wilson\***. Reanimating extinct plants. Delivered at Japanese–American–German Frontiers of Science symposium, Bad-Neuenahr, Germany. (2017)
3. **Jonathan P. Wilson**, Nicholas M. Munves. Silica bodies in conifer foliage: results of a common-garden experiment and implications for the history of the terrestrial silica cycle. Presented at the Annual Meeting of the Geological Society of America, Seattle, WA. (2017)

4. **Jonathan P. Wilson**, Elizabeth Trembath-Reichert, Shawn McGlynn, Woodward W. Fischer, Christine Quake, Aaron Levine. A Geobiological Perspective On The Evolutionary History Of The Terrestrial Silica Cycle. Presented at the Northeastern Geobiology Symposium, New Haven, CT. (2014)
5. **Jonathan P. Wilson**, Woodward W. Fischer. Quantitative Hydraulic Models Of Early Land Plants Provide Insight Into Middle Paleozoic Terrestrial Paleoenvironmental Conditions. Presented at the Annual Meeting of the American Geophysical Union, San Francisco, CA. (2010)
6. **Jonathan P. Wilson**, and four others. The Evolutionary History of Water Transport in Living and Fossil Plants. Presented at 7<sup>th</sup> Annual Southern California Geobiology Symposium, Pasadena, CA. (2010)
7. **Jonathan P. Wilson** and 18 others. Geobiology of the Late Paleoproterozoic Duck Creek Dolomite, Western Australia. Presented at Annual Meeting of the Geological Society of America, Houston, TX. (2008)

## Field Work and Courses

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Field course: Trinidad and Tobago	2017, 2018, 2020, 2023
Field course: Yunnan, China	2019
Field research: Art and the Environment in the Setō Inland Sea, Japan	2019
Field research: Carboniferous plants of Colorado and New Mexico	2012–Present
Field research: Paleoproterozoic geobiology and microfossils of Western Australia	2007
Field research: Neoproterozoic trace fossils of Namibia	2006
Tropical Botany: Fairchild Tropical Botanic Garden, Florida	2004
Field research: Early Ordovician palynology, Dingle Peninsula, SW Ireland	2001, 2002

## Teaching and Advising Experience

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### Senior Thesis Projects Supervised at Haverford College:

Jessica Korgen	Anatomy and physiology of extinct arborescent lycopods	2023–2024
Sophia Wagner	Anatomy and physiology of extinct sphenopsid <u>Sphenophyllum</u>	2023–2024
Ella Culton	Anatomy and physiology of Carboniferous plants	2022–2023
Charlie Mamlin	Anatomy and physiology of Carboniferous plants	2022–2023
Griffin Kaulbach	Silica biomineralization in <u>Picea</u> (spruce)	2021–2022
Catherine Kim	Leaf microbiome of invasive and native <u>Phragmites australis</u>	2021–2022
Mallory Kastner	Photosynthetic biochemistry of <u>Ginkgo biloba</u> in elevated CO <sub>2</sub> *	2020–2021
James Dougherty	Gas exchange analysis of <u>Ginkgo biloba</u> in elevated CO <sub>2</sub> *	2020–2021
Lily Bennett	Physiological response of <u>Ginkgo biloba</u> to elevated CO <sub>2</sub> *	2019–2020
Natalia Amaral	Leaf microbiome of <u>Theobroma cacao</u> (chocolate)	2017–2018
Brian Keller	Paleoecology of Carboniferous plants	2017–2018
Amelia Keyser-Gibson	Leaf microbiomes of invasive and native <u>Phragmites australis</u>	2017–2018
Nick Munves	Microbial ecology of <u>Ficus</u> species' leaves	2017–2018
Jessica Smart	Physiology of the extinct sphenopsid <u>Sphenophyllum</u>	2017–2018
Audra Devoto	Microbial ecology of <u>Ficus</u> species' leaves	2016–2017
Ariel Dineen	Water use in <u>Welwitschia mirabilis</u>	2016–2017
Charlie Hale	Leaf microbiomes of invasive and native <u>Phragmites australis</u>	2016–2017
Gabriel Oppler	Physiology of Carboniferous Period tree ferns and seed plants *	2016–2017
Liz Reikowski	Physiology of Carboniferous Period sphenopsids *	2016–2017
Remmy Chen	Physiological trends within Carboniferous Period medullosans *	2015–2016
Deana Rauh	Gas exchange variability among <u>Sphenophyllum</u> species *	2015–2016
Isabella Muratore	Insect herbivory upon Carboniferous Period plants	2015–2016
Evan Walser-Kuntz	Delimiting ecotypes of <u>Archaeopteris</u> species	2015–2016
Charlie Marquardt	Root hydraulic conductivity in <u>Cordaites</u> *	2015–2016
Marie Greaney	PIN1 and the origins of leaves in ferns	2013–2014
Aaron Levine	Silicon accumulation by vascular plants: NIP2	2013–2014

Gregory Miraglia	<u>Glossopteris</u> hydraulics and the P/T extinction*	2013–2014
Minna Yoshikawa	Foliar water uptake in <u>Welwitschia mirabilis</u>	2013–2014
Katherine Bigay	Stomatal size increases with high [CO <sub>2</sub> ]	2012–2013
Kim Carlomagno	A new bacterial species isolated from pine needles	2012–2013
Sarah Crist	PIN1 and the origins of leaves in ferns	2012–2013
Christine Quake	Silicon accumulation by vascular plants: NIP2	2012–2013
Kelsey Capron	Hydraulic path length in leafless plants	2011–2012
Emily Dutrow	Effect of herbivory on photosynthetic rate	2011–2012
Anna Rayne	Stomatal response to high [CO <sub>2</sub> ] and water stress	2011–2012
Rebecca Tobet	<u>Sphenophyllum</u> hydraulics and biomechanics*	2011–2012

\* Denotes work published or in manuscript form

### Selected Courses at Haverford College:

ENVS 101: Case Studies in Environmental Issues	<i>(Interdisciplinary introductory course in Environmental Studies focused on case studies from contemporary environmental problems, including agriculture, water, energy, and more.)</i>
ENVS 118/318: Plants and People/Economic Botany	<i>(Combined majors/nonmajors course on the coevolution of plants and human societies.)</i>
ENVS 201: Environmental Science	<i>(Required field-based course on Earth, life, and atmospheric sciences.)</i>
ENVS & Biology 314: Photosynthesis	<i>(Lecture course on the evolutionary history of photosynthesis, from fossils to biochemistry.)</i>
ENVS 328: Botany	<i>(Advanced course on plant evolution, morphology, development, and physiology.)</i>
ENVS & Biology 413: Senior Research Tutorial in Plant Biology and Evolution	<i>(Supervised senior thesis research with a lab of four to six advanced undergraduate students.)</i>
ENVS 397: Senior Seminar in Environmental Studies	<i>(Interdisciplinary, project-based, capstone course for advanced undergraduate students.)</i>
Biology 200: Cellular and Molecular Biology	<i>(Introductory lecture and laboratory course for molecular biology majors with emphasis on insights from evolutionary history, including phylogenetics and plant biophysics.)</i>
Biology 300: Laboratory in Molecular Biology and Biochemistry	<i>(Research laboratory course exploring the diversity of plant microbiomes using culture-independent and culture-dependent methods.)</i>

### Selected Courses Taught at Other Institutions:

Colorado College, Invertebrate Paleontology	2018
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### Selected Guest Lectures:

Bryn Mawr College, Evolution	2011–present
University of Wyoming: Paleobotany (graduate course)	2017, 2018, 2020
Haverford College, Biomechanics	2018
Haverford College, Introduction to Peace, Justice, and Human Rights	2018
Haverford College, Art and the Environment in East Asia	2017
Colorado College, Historical Geology	2016
Bryn Mawr College, Paleobiology	2011–2016
Haverford College, Nature/Culture	2015
Haverford College, Imagining the Arctic	2014
Haverford College, Religion, America, and the Science of Life	2013
Caltech, Introduction to Geobiology	2010
Pomona College, History of the Biosphere	2010
Caltech, Earth and the Biosphere	2010

Harvard University, Biology of Plants 2008, 2009  
Smith College, Paleontology and Evolution 2007, 2008

**Sophomore Advising Coordinator** 2008–2009  
Winthrop House, Harvard College

**Resident Tutor in Earth and Planetary Sciences** 2007–2009  
Winthrop House, Harvard College

**Visiting Researcher in Plant Physiology** 2003  
Institute of Molecular Biology, University of Copenhagen

### Selected College and Departmental Service

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Science representative, Human Subjects IRB Committee 2024–2025  
Chair, promotion and tenure case (theoretical astrophysics) 2023–2024  
Search Committee, Department of Environmental Studies: Environmental Social Sciences 2022–2023  
Search Committee, Department of Environmental Studies: Environmental Social Sciences 2017–2018  
Search Committee, Department of Environmental Studies: Environmental Humanities 2017–2018  
Search Committee, Department of Economics: Environmental Economics 2017–2018  
Council for Sustainability and Social Responsibility 2016–2021  
Search Committee, Department of Economics: Environmental Economics 2016–2017  
Faculty advisor, Haverfarm 2016–2024  
Faculty representative, Premedical/Prehealth Committee 2016  
Search Committee, Department of Biology: Biochemistry 2015–2016  
Search Committee, Department of Economics: Environmental Economics 2012–2013  
Search Committee, Department of Anthropology: Environmental Anthropology 2012–2013  
Tri-College Environmental Studies Committee 2011–present  
Steering Committee, Luce Initiative on Asian Studies and the Environment 2012–2019  
Faculty representative, Committee for Environmental Responsibility 2012–2013  
Study Abroad Advisor, Department of Biology 2011–2018

### Professional Affiliations

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Geological Society of America, Paleontological Society, International Association of Wood Anatomists, Botanical Society of America, American Geophysical Union, Yellowstone-Bighorn Research Association

### Selected Community Service

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**Chair:** Environmental Advisory Council, Tredyffrin Township, Chester County, PA  
*(Appointed by the Tredyffrin Township Board of Supervisors to serve in an advisory role for environmental issues in the local community. Elected chair of the council in 2023.)*

**Board Member:** LandHealth Institute, Philadelphia, PA (2019–2021)  
*(Local nonprofit focused on environmental justice and education in the greater Philadelphia area.)*