

Zoe G. Cardon

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Cardon is an ecosystems ecologist with roots in mechanistic plant physiology. She is fascinated by how plants contribute to ecosystem function both aboveground (as primary producers and gatekeepers of water flow from biosphere to atmosphere) and belowground (particularly as partners with microbes and soils in the fundamental terrestrial commodities exchange -- the rhizosphere). Her work is interdisciplinary and collaborative, combining development of genetically engineered microbial sensors, *in situ* imaging, and stable isotope techniques, with emerging systems modeling, organismal, and “omics” approaches.

EDUCATION AND POSTDOCTORAL TRAINING

DOE Global Change Distinguished Postdoctoral Fellow, UC Berkeley, F. S. Chapin III advisor (1994-96)
Ph.D., Department of Biological Sciences, Stanford University, 1994. *Cellular and Physiological Investigations of Stomatal Regulation*, Joseph Berry advisor.
B.S. Biology, B.A. Spanish, Utah State University, 1988; College of Science valedictorian; graduation *Magna Cum Laude*. Keith Mott, research advisor.

PROFESSIONAL POSITIONS

Marine Biological Laboratory (MBL), Woods Hole, MA
2008 - current Senior Scientist, The Ecosystems Center
2006-2007 Adjunct Associate Scientist, The Ecosystems Center
Fall 2003 Visiting Scientist, The Ecosystems Center
University of Connecticut, Storrs, CT
2005-2007 Associate Director, Center for Integrative Geosciences
2005-2007 Graduate Program Director, Center for Integrative Geosciences
2003-2007 Associate Professor, Ecology and Evolutionary Biology
2003-2005 Head, Biology Honors Program (Depts. of Ecology and Evolutionary Biology; Physiology and Neurobiology; Molecular and Cell Biology)
1997-2003 Assistant Professor, Ecology and Evolutionary Biology
Harvard University, Cambridge, MA
Fall 2002 Sarah Blaffer Hrdy Fellow in Conservation Biology, Organismic and Evolutionary Biology Department
Bowdoin College, Brunswick, ME
1996-1997 Assistant Professor, Biology Department

AFFILIATED POSITIONS

University of Chicago, Chicago, IL
2016 – current The Microbiome Center
Brown University, Providence, RI
2017 - 2022 Adjunct Professor, Ecology and Evolutionary Biology Department
2016-2017 Professor (MBL), Ecology and Evolutionary Biology Department
2010-2015 Professor (MBL), Geological Sciences Department

SOCIETY MEMBERSHIPS

American Association for the Advancement of Science (AAAS)
American Geophysical Union (AGU)
American Society for Microbiology (ASM)
Ecological Society of America (ESA)

SELECTED HONORS

Invited participant, American Academy of Microbiology (Academy) and American Geophysical Union (AGU) Colloquium “*The Role of Microbes in Mediating Methane Emissions – Act Today to Prepare for Tomorrow*” (2023)
Fellow, American Association for the Advancement of Science (AAAS) (named in 2022)
Elected to the Governing Board of the Ecological Society of America (term 2020-2022)
Elected to the User Executive Committee of the Environmental Molecular Sciences Laboratory (EMSL) at Pacific Northwest National Laboratory (term 2020-2023)
Fellow, Ecological Society of America (named in 2018)
Invited participant, National Microbiome Initiative, White House Office of Science and Technology Policy, Washington, DC; Kavli Futures Symposium “Cracking the Microbiome: Developing Experimental Tools to Understand Microbial Function”; OSTP forum “Microbiome Innovation: Roadmap to the Future”; OSTP workshop “The Microbiome: Developing a Roadmap for Discovery”; OSTP launch.(2015-2016).
Invited speaker, 100th annual Ecological Society of America meeting, Ignite Session organized by the Ecological Society of America’s Science Committee: “Advances, Frontiers, Applications, and Challenges within and across Ecological Disciplines: a Celebration of ESA’s Centennial, and a Roadmap for the Next 100 Years”, Baltimore, Maryland, (2015)
Elected President (2009-2011) and Secretary (2002-2004), Physiological Ecology Section, Ecological Society of America
Sarah Blaffer Hrdy Fellow in Conservation Biology, Organismic and Evolutionary Biology, Harvard University (2002)
University of Connecticut University-wide Outstanding Faculty Advisor (1999)
Department of Energy Global Change Distinguished Postdoctoral Fellow (1993-95)
National Defense Science and Engineering Graduate Fellow (1990-93)
National Science Foundation Graduate Fellow (1988-90)
Phi Kappa Phi James R. Slater Fellow, for excellence in plant sciences (1988-89)
National Merit Scholar (1983-87)
Presidential Scholar (1983)

INVITED SYMPOSIA, SERIES AND DEPARTMENTAL TALKS

Symposia:

Invited speaker, American Geophysical Union symposium, B43B-01”Plant virus effects on rhizosphere root-microbe-mineral interactions.” AGU fall annual meeting, San Francisco, CA (2023)
Invited keynote speaker, “There Ought to Be an Equation for That: A Symposium Celebrating the Extraordinary Career of Joseph Berry”, Carnegie Institution for Science Department of Global Ecology, Palo Alto, CA (2022) <https://berrysymposiumdraft.my.canva.site/>
Invited speaker, Friday Evening Lecture Series, Marine Biological Laboratory (2022) <https://www.mbl.edu/events/friday-evening-lectures/2022-friday-evening-lectures>

- Invited Plenary speaker, EMSL Integration Meeting, Pacific Northwest National Lab (2021)
- Invited speaker, American Geophysical Union symposium “Plants-microbes-minerals: interactions that drive soil organic matter cycling”, AGU fall annual meeting, San Francisco, CA (2019)
- Invited speaker, American Society of Agronomy symposium “Water movement in soil and plants”, ASA-CSA-SSA annual meeting, San Antonio, TX (2019)
- Invited Keynote speaker, Goldschmidt Conference, session 12d “Interactions between Soil and Biota as Controls on Ecosystem Function from Canopy to Rhizosphere”, Geochemical Society and the European Association of Geochemistry, Boston, MA (2018)
- Invited speaker, Goldschmidt Conference, session 12f “Identifying and Modeling Mechanistic Drivers of Elemental Cycles Across the Critical Zone”, Geochemical Society and the European Association of Geochemistry, Boston, MA (2018)
- Invited speaker, Hydrology Section and Biogeosciences Section session “Hydrobiogeochemical interactions among plants, soil and microorganisms at molecular to single plant scales.” American Geophysical Union (AGU) Fall Meeting, San Francisco, CA, (2016)
- Invited speaker, Ignite Session organized by the Ecological Society of America’s overall Science Committee: “Advances, Frontiers, Applications, and Challenges within and across Ecological Disciplines: a Celebration of ESA’s Centennial, and a Roadmap for the Next 100 Years”, 100th annual Ecological Society of America meeting, Baltimore, MD, (2015)
- Invited speaker, Harvard University Plant Biology Initiative Symposium, “Plants and Climate Change: From Leaves to Ecosystems” (2015)
- Invited speaker, MBL Celebration of Discovery (2015)
- Invited speaker, AGU session “B32D: Ideas in Terrestrial Biogeochemistry: Tell the Story”, San Francisco, CA, December (2014)
- Invited speaker, 5th ASM Conference on Beneficial Microbes, invited main talk for “Ecology of Host-Microbial Interactions” session. Washington DC, September 2014
- Invited Plenary speaker, DOE TES/SBR Joint Investigators Meeting, Plenary Session III “Plant Genomics to Ecosystem Function”, Washington DC May (2014)
- Invited Plenary speaker, DOE Environmental Molecular Sciences Laboratory meeting “Plants, Microbes, and their Interactions” (2013)
- Invited speaker, Keystone Symposium on Microbial Communities as Drivers of Ecosystem Complexity, Breckenridge, Colorado (2011)
- Invited speaker, Ecological Society of America meetings, organized oral session “Missing Links in the Root-Soil Organic Matter Continuum” (2009)
- Invited speaker, Soil Science Society of America meetings, symposium “Towards a Predictive Understanding of Belowground Ecosystem Responses to Global Change” (2006)
- Invited speaker, Ecological Society of America meetings, organized oral session “Rhizosphere Functioning in Carbon and Nitrogen Cycles” (2006)
- Invited speaker, Ecological Society of America meetings, organized oral session “Sensors and Sensor Networks” (2005)
- Invited Keynote speaker, Soil Ecology Society Meeting, keynote "Resource Exchange in the Rhizosphere" (2005)
- Invited speaker, Global Change in Terrestrial Ecosystems workshop, Oxford, UK “Carbon Below Ground” (1995).

Departmental or Series Seminars:

Harvard Forest, Harvard University (2021)
 Oregon State University, Harvard Lecture (2020 – postponed due to COVID)
 Northern Arizona University, Department of Biological Sciences (2018)
 Cornell University, IGERT: Cross-Scale Biogeochemistry and Climate (2017)
 University of Chicago, Department of Ecology and Evolution (2016)
 University of Massachusetts, Amherst, Plant Biology Graduate Program (2016)
 University of Maryland, Dept of Plant Science and Landscape Architecture (2015)
 Stonybrook University, Ecology and Evolution Dept. (2014)
 University of Massachusetts, Amherst, Microbiology Dept. (2013)
 Harvard Forest, Petersham, MA October (2011)
 University of Vermont, Plant and Soil Science Department (2011)
 Michigan State University, graduate student invitee for MCB department (2010)
 Boston University, Biology Department, Boston University (2010)
 Brown University, Dept. of Geological Sciences (2009)
 Bowdoin College, Biology Dept. (2008)
 The Ecosystems Center, Marine Biological Laboratory (2007)
 UMass Boston, Boston, MA, Department of Biology (2007)
 MIT, ESI (Earth System Initiative) (2006)
 Michigan State University, Department of Plant Biology (2005)
 University of Massachusetts, Amherst, OEB Program (2004)
 Tufts University, Biology Department (2004)
 The Ecosystems Center, Marine Biological Laboratory (2003)
 Univ. of Michigan, Ecology and Evolutionary Biology Department (2003)
 MIT, Earth Atmosphere and Planetary Sciences Dept. (2003)
 Cornell University, Biogeochemistry and Biocomplexity Seminar Series (2002)
 Biosphere II, Columbia University, Oracle, AZ (2002)
 University of Illinois, Chicago, Dept. of Biology, and Argonne National Lab (2002)
 Columbia Earth Institute (Lamont-Doherty Earth Science Colloquium) (2002)
 Harvard University, Organismic and Evolutionary Biology Department (2002)
 Queens College, Department of Biology (2001)
 Carnegie Institution of Washington, Department of Plant Biology, Stanford, CA (2001)
 The Ecosystems Center, Marine Biological Labs, Woods Hole, MA (2001)
 Institute of Ecosystem Studies, Milbrook, NY (2001)
 Boston University, Dept. of Biology, Boston, MA (2000)
 SUNY Albany, Atmospheric Sciences Research Center (1998)
 University of Connecticut, Dept. of Ecology and Evolution, Storrs, CT (1997)
 University of New Hampshire, Dept. of Natural Resources. Durham, NH (1996)
 The Ecosystems Center, Marine Biological Laboratory, Woods Hole. MA. (1996)
 University of Denver, Denver, Colorado. (1995)
 Bowdoin College, Brunswick, Maine (1995)
 University of California, Berkeley, Department of Integrative Biology (1994)
 James Cook Univ. of North Queensland, Botany Dept., Townsville, Australia. (1992)
 Australian National University, RSBS, Canberra, Australia. (1992)

General Public Seminars, Webinars & Radio Interviews

Plant Roots as Underground Allies on our Changing Planet. MBL Friday Evening Lecture (2022) <https://www.mbl.edu/events/friday-evening-lectures/2022-friday-evening-lectures>

Surprising Things Plant Roots Do. Thursday evening talk for The 300 Committee Land Trust (2022). <https://www.youtube.com/watch?v=Cn0APoU3iwg>

Wildlands and Woodlands: A Vision for Sustaining Forested and Natural Landscapes.

Sponsored by the MBL's Falmouth Forum and by The 300 Committee. Co-interviewee with David Foster, interviewer Mindy Todd, *The Point*, WCAI. (2021)

Death Defying Down-regulation Among Algae Living High and Dry in Desert Ecosystems.

Ecosystems Center and Semester in Environmental Science Webinars, MBL (2020). Co-presenter with Elena Lopez Peredo.

<https://mbl.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=0b75e805-de0b-4cdf-933a-ac77010853ae>

Picture a Scientist. One hour live panel discussion focusing on women in science after movie screening, sponsored by the MBL. Co-panelist with K. Gribble, S. Nemes, J. Gitlin. (2020).

Shades of Green Energy. Austin, TX. Discussion about sustainability and ecology, associated with the "Austin Night for Nature" event, Ecological Society of America meeting (2011).

<https://archive.org/details/ShadesOfGreenEnergyAugust42011EcologicalSocietyOfAmerica>

SERVICE ON NATIONAL COMMITTEES AND INSTITUTIONAL BOARDS

U.S. Department of Energy, triennial reviewer, Oak Ridge National Laboratory (2023)

Elected to the Governing Board of the Ecological Society of America, Member-At-Large (term 2020-2022). Governance Subcommittee, Finance Committee, Nominations Committee, and Adhoc Governance and Leadership Committee.

Elected to the User Executive Committee of the Environmental Molecular Sciences Laboratory (EMSL) at Pacific Northwest National Laboratory (term 2020-2023)

Invited senior mentor, "Woodstoich" 2019, a project-focused week for early career scientists studying ecological stoichiometry. Special suite of papers introduced by Evans-White et al. 2019 in *Frontiers in Ecology and Evolution* resulted. (doi: 10.3389/fevo.2019.00463)

U.S. Department of Energy, triennial reviewer, Oak Ridge National Laboratory (2019)

Invited member, sub-committee of the Department of Energy's Biological and Environmental Research Advisory Committee (BERAC) evaluating current and future utilization of DOE's National User Facilities for research aligned with BER's *Grand Challenges*. (2017-2018).

Report: https://science.osti.gov/-/media/ber/pdf/community-resources/2018/BERAC_UserFacilities_Report.pdf?la=en&hash=7567B911F08BA759D1CE94AB11C4CAFE5E77C6D8

Invited participant, the National Microbiome Initiative, White House Office of Science and Technology Policy, Washington, DC, including Kavli Futures Symposium "Cracking the Microbiome: Developing Experimental Tools to Understand Microbial Function" (2015), OSTP forum "Microbiome Innovation: Roadmap to the Future", (2015), OSTP workshop "The Microbiome: Developing a Roadmap for Discovery" (2015), and OSTP launch of the "National Microbiome Initiative" (2016).

U.S. Department of Energy, triennial reviewer, Oak Ridge National Laboratory (2015)

U.S. Department of Energy, triennial reviewer, Joint Genome Institute (2014)

Organizer, Ecological Society of America Annual Meeting, fund-raising concert at the Moody Theatre, Austin, TX, to showcase local environmental groups. 20 groups participated (2011)

President (elected), Physiological Ecology Section, Ecological Society of America (2009-2011)
Invited member of nominating committee to establish the Board of Directors for the National
iPlant Collaborative (<http://www.iplantcollaborative.org/>) (2008)
Invited member of the Program Leaders Committee, NSF-funded Statistical and Applied
Mathematical Sciences Institute (SAMSI) program on statistics for control of wireless
sensing networks and analysis of data streams (2007-2008)
Secretary (elected), Physiological Ecology Section, Ecological Society of America (2002-2004)
Invited member, international panel to review the National Phytotron at Duke (2001)

SERVICE – GRANT AND JOURNAL REVIEWS

Grant review panels and ad hoc reviews

National Science Foundation, grant review panel member (some over multiple years):

Doctoral Dissertation Improvement Grants (DDIG)

Integrative Organismal Systems (IOS)

Ecology

Ecology and Evolutionary Physiology

Ecosystem Studies

IGERT (Integrative Graduate Education and Research Traineeship)

SitS (Signals in the Soil)

TECO (Terrestrial Ecology and Global Change)

DOE Environmental Molecular Sciences Lab, Terrestrial & Subsurface Ecosystems panel.

DOE Joint Genome Institute Small-scale microbial/metagenome program panel.

U.S. Department of Energy (DOE) Alexander Hollaender Postdoctoral Fellowships panel.

Ad hoc reviewer for multiple grant proposals from European Research Council (Frontier
Research Grants), NSF, NASA, NERC, DOE, University of Connecticut, USDA, Utah
State University, San Jose State University

Journal reviews

Reviewer for *American Naturalist*, *Biogeochemistry*, *Biology Letters*, *Ecological Applications*,
Ecology, *Ecosystems*, *Global Change Biology*, *Journal of Ecology*, *Journal of*
Environmental Quality, *Journal of Geophysical Research Biogeosciences*, *Journal of*
Theoretical Biology, *mSystems*, *Microbial Ecology*, *Nature Microbiology*, *New Phytologist*,
Oecologia, *Physiologia Plantarum*, *Plant and Soil*, *Plant Cell and Environment*, *PNAS*,
Science, *Soil Biology and Biochemistry*, *Wetlands*

Editorial Board, *Oecologia* (2004-2012)

INVITED WORKSHOPS AND ASSOCIATED PUBLICATIONS

Invited workshop, plenary speaker, *EcoSENSE Workshop - Emerging Sensing Capabilities and*
Ecosystem Testbeds for Investigating Soil-plant-microbial Interactions Across Genome to
Ecosystem Scales. (2021) Lawrence Berkeley National Laboratory, Berkeley, CA.

Invited DOE-funded workshop, *Opportunities in Biological and Environmental Research*
Uniquely Enabled by the APS Upgrade (APS-U), Argonne National Laboratory (2018).

Report: [aps.anl.gov/sites/www.aps.anl.gov/files/APS-Uploads/PUBLICATION-
FILES/Workshop%20to%20Identify%20Opportunities%20in%20Biological%20and%20En
vironmental%20Research.pdf](https://aps.anl.gov/sites/www.aps.anl.gov/files/APS-Uploads/PUBLICATION-FILES/Workshop%20to%20Identify%20Opportunities%20in%20Biological%20and%20Environmental%20Research.pdf)

Invited NSF-funded workshop, University of Chicago, “*The Subterranean Macroscopic: Sensor*
Networks for Understanding, Modeling, and Managing Soil Processes” (2017)

- Invited workshop, Environmental Molecular Sciences Laboratory, Pacific Northwest National Laboratory, “*Breakthrough Science & Technologies (BS&T) Workshop*” (2017)
- Invited workshop, White House Office of Science and Technology Policy, “*The Microbiome: Developing a Roadmap for Discovery*”, Washington, DC., (2015)
- Invited workshop, “*Belowground Carbon Cycling Processes at the Molecular Scale: New Tools for User Research*”, Environmental Molecular Sciences Laboratory at Pacific Northwest National Lab, Richland, WA (2013)
- Invited workshop, American Academy of Microbiology colloquium “*Incorporating microbes into climate models*”, Dallas, TX (2011) Report:
https://www.ncbi.nlm.nih.gov/books/NBK561255/pdf/Bookshelf_NBK561255.pdf
- Invited workshop, NSF “*Frontiers in Belowground Carbon Cycling Research*” (2003). Report:
[https://doi-org.library.proxy.mbl.edu/10.1890/1540-9295\(2004\)002\[0522:CCIS\]2.0.CO;2](https://doi-org.library.proxy.mbl.edu/10.1890/1540-9295(2004)002[0522:CCIS]2.0.CO;2)

PATENT

2021. Scalable, large-area optical sensing platform with compact light delivery and imaging system. Patent number: 11035794 Date of Patent: June 15, 2021.
 Inventors: Xufeng Zhang, Supratik Guha, Zoe G. Cardon

PUBLICATIONS

Submitted:

- Zhou Y, O’Meara T, **Cardon ZG**, Wang J, Sulman BN, Giblin A, Forbrich I. Simulated plant-mediated oxygen input has strong impacts on fine-scale porewater biogeochemistry and weak impacts on integrated methane fluxes in coastal wetlands. *Biogeochemistry*
- Sulman BN, Wang J, LaFond-Hudon S, O’Meara T, Yuan F, Molins S, Hammond G, Forbrich I, **Cardon ZG**, Giblin AE. Integrating tide-driven wetland soil redox and biogeochemical interactions into a land surface model. *Journal of Advances in Modeling Earth Systems*
- Ahkami AH, Qafoku O, Roose T, Lu Y, Mou Q, **Cardon ZG**, Wu Y, Fisher JB, Varga T, Handakumbura P, Aufrecht JA, Bhattacharjee A, Moran JJ. Emerging sensing, imaging, and computational technologies to unravel nano- and macro-scale rhizosphere dynamics – review and research perspectives. *Soil Biology and Biochemistry*

Publications focused on the rhizosphere, microbiomes, salt marsh and soil

- Pérez Castro S, Peredo EL, Mason O, Vineis J, Bowen J, Mortazavi B, Ganesh A, Ruff SE, Paul B, Giblin AE, **Cardon ZG** (2023) Diversity from single nucleotide variant to metagenome scales among sulfur cycling bacteria in Massachusetts and Alabama salt marsh. *AEM*, *in press*.
- Rand DM, Nunez JCB, Williams S, Rongl S, Burley JT, Neil KB, Spierer AN, McKerrow W, Johnson DS, Fayton TJ, Skvir N, Ferranti DA, Greenhill M, Lyons A, Okami N, Morgan DM, Raynes Y, Kinney K, Brown BRP, Giblin AE, **Cardon ZG**. (2023) Parasite manipulation of host phenotypes inferred from transcriptional analyses in a trematode-amphipod system. *Molecular Ecology*. DOI: 10.1111/mec.17093
- Arredondo M, Fang Y, Jones M, Yabusaki SB, **Cardon ZG**, Keiluweit, M. (2023) Resolving dynamic mineral-organic interactions in the rhizosphere by combining *in-situ* microsensors with plant-soil reactive transport modeling. *Soil Biology and Biochemistry*. 184:109097. <https://doi.org/10.1016/j.soilbio.2023.109097>

- Li H, Bölscher T, Winnick M, Tfaily MM, **Cardon ZG**, and Keiluweit M. (2021) Simple plant and microbial metabolites destabilize mineral-associated organic matter via multiple pathways. *Environmental Science and Technology* 55(5): 3389–3398 doi: 10.1021/acs.est.0c04592
- Fu C, Wang G, Bible K, Goulden ML, Saleska SR, Scott RL, **Cardon ZG**. (2018) Hydraulic redistribution affects modeled carbon cycling via soil microbial activity and suppressed fire. *Global Change Biology*.24(8):3472-3485. doi: 10.1111/gcb.14164
- Biteen JS, Blainey PC, **Cardon ZG**, Chun M, Church G, Dorrestein PC, Fraser SE, Gilbert J, Jansson JK, Knight R, Miller JF, Ozcan A, Prather KA, Taha S, Ven den Engh G, Quake S, Ruby EG, Silver P, Weiss PS, Wong GCL, Wright AT, Xie XS, Young TD (2016) Tools for the Microbiome: Nano and Beyond. *ACS Nano*, 10:6-37. DOI: 10.1021/acsnano.5b07826. (Most read *ACS Nano* paper of 2016.)
- Blaser MJ, **Cardon ZG**, Cho MK, Dangl JL, Donohue TJ, Green JL, Knight R, Maxon ME, Northen TR, Pollard KS, Brodie EL. (2016) Towards a predictive understanding of Earth's microbiomes to address 21st Century challenges. *mBio*. 7:e00714-16. doi: 10.1128/mBio.00714-16
- Espeleta JF, **Cardon ZG**, Mayer KU, Neumann RB. (2016) Diel plant water use and competitive soil cation exchange interact to enhance NH_4^+ and K^+ availability in the rhizosphere. *Plant and Soil* 414:33. doi: 10.1007/s11104-016-3089-5
- Fu C, Wang G, Goulden ML, Scott RL, Bible K, and **Cardon ZG**. (2016) Modeling the hydrological impact of hydraulic redistribution using CLM4.5 at eight AmeriFlux Sites. *Hydrology and Earth System Sciences* 20:2001-2018. doi:10.5194/hess-20-2001-2016
- Graves CJ, Makrides E, Schmidt V, Giblin A, **Cardon ZG**, Rand D. (2016) Functional responses of salt marsh microbial communities to long-term nutrient enrichment. *Applied and Environmental Microbiology* 82:2862-2871. doi: 10.1128/AEM.03990-15
- Alivisatos AP et al. (2015) A unified initiative to harness Earth's microbiomes. *Science* 350:507-508. (45 authors in Unified Microbiome Initiative Consortium.)
- Thomas F, Giblin AE, **Cardon ZG**, Sievert SM. (2014) Rhizosphere heterogeneity shapes abundance and activity of sulfur-oxidizing bacteria in vegetated salt marsh sediments. *Frontiers in Microbiology* 5:309 doi: 10.3389/fmicb.2014.00309.
- Neumann R, **Cardon ZG**, Teshera-Levy J, Rockwell F, Zwieniecki M, Holbrook NM. (2014) Modeled hydraulic redistribution by sunflower (*Helianthus annuus* L.) matches observed data only after including nighttime transpiration. *Plant Cell and Environment* 37:899-910
- Cardon ZG**, Stark JM, Herron PM, Rasmussen JA. (2013) Sagebrush carrying out hydraulic lift enhances surface soil nitrogen cycling and nitrogen uptake into inflorescences. *Proceedings of the National Academy of Sciences, USA* 110(47):18988-18993. 10.1073/pnas.1311314110
- Herron PM, Gage DJ, Arango Pinedo C, Haider ZK and **Cardon ZG** (2013) Better to light a candle than curse the darkness: illuminating spatial localization and temporal dynamics of rapid microbial growth in the rhizosphere. *Frontiers in Plant Science* 4:323. doi: 10.3389/fpls.2013.00323
- Neumann, R.B. and **Z.G. Cardon** (2012). Tansley Review: The magnitude of hydraulic redistribution by plant roots: a review and synthesis of empirical and modeling studies. *New Phytologist* 194:337-352. doi: 10.1111/j.1469-8137.2012.04088.x
- Skogen, K.A., Holsinger, K.E., and **Cardon, Z.G.** (2011) Nitrogen deposition and the decline of a regionally threatened legume, *Desmodium cuspidatum*. *Oecologia* 165:261–269.

- Xia, LC, Steele, JA, Cram, JA, **Cardon, ZG**, Simmons, SL, Vallino, JJ, Fuhrman, JA, Sun, F (2011) Extended local similarity analysis (eLSA) of microbial community and other time series data with replicates. *BMC Syst. Biol.* 5, S15. doi: 10.1186/1752-0509-5-S2-S15
- Herron, P.M., Gage, D.J., and **Cardon, Z.G.** (2010) Micro-scale water potential gradients visualized in soil around plant root tips using microbiosensors. *Plant, Cell, and Environment* 33:199-210. doi: 10.1111/j.1365-3040.2009.02070.x.
- Herron, P.M., Stark, J.M., Holt, C., Hooker, T., and **Cardon, Z.G.** (2009) Microbial growth efficiencies across a soil moisture gradient assessed using ¹³C-acetic acid vapor and ¹⁵N-ammonia gas. *Soil Biology and Biochemistry* 41:1262-1269. doi: 10.1016/j.soilbio.2009.03.010
- Gage, D.J., Herron, P.M., Arango Pinedo, C., and **Cardon, Z.G.** (2008) Live reports from the soil grain – the promise and challenge of microbiosensors. *Functional Ecology* 22: 983-989. doi: 10.1111/j.1365-2435.2008.01464.x
- Cardon, Z.G.** and Gage, D.J. (2006) Resource exchange in the rhizosphere – molecular tools and the microbial perspective. *Annual Review of Ecology, Evolution, and Systematics* 37: 459-88. doi: 10.1146/annurev.ecolsys.37.091305.110207
- Gartner, T.L. and **Cardon, Z.G.** (2006) Site of leaf origin affects how mixed litter decomposes. *Soil Biology and Biochemistry* 38: 2307-2317. doi: 10.1016/j.soilbio.2006.02.014
- Hooker, B.A., Morris, T. F., Peters, R., and **Cardon, Z.G.** (2005) Long-term effects of tillage and corn stalk return on soil carbon dynamics. *Soil Science Society of America Journal* 69 (1) : 188-196. doi: 10.2136/sssaj2005.0188
- Venterea, R.T., Rolston, D.E., and **Cardon, Z.G.** (2005) Effects of soil moisture, physical, and chemical characteristics on abiotic nitric oxide production. *Nutrient Cycling in Agroecosystems* 72:27-40.
- Gartner, T. B. and **Cardon, Z. G.** (2004) Decomposition dynamics in mixed-species leaf litter — a review. *Oikos* 104: 230-246. doi: 10.1111/j.0030-1299.2004.12738.x
- Johnston, C. A., Groffman, P., Breshears, D. D., **Cardon, Z. G.**, Currie, W., Emanuel, W., Gaudinski, J., Jackson, R. B., Lajtha, K., Nadelhoffer, K., Nelson Jr., D., Post, W. M., Retalack, G., and Wielopolski, L. (2004) Carbon cycling in soil. *Frontiers in Ecology and the Environment*, 2(10): 522-528.
- Cardon, Z. G.**, Czaja, A. D., Funk, J. L., and Vitt, P. L. (2002) Periodic carbon flushing to roots of *Quercus rubra* saplings affects soil respiration and rhizosphere microbial biomass. *Oecologia* 133: 215-223. doi: 10.1007/s00442-002-1045-y
- Bringhurst, R. M., **Cardon, Z. G.**, and Gage, D. J. (2001) Galactosides in the rhizosphere: utilization by *Sinorhizobium meliloti* and development of a biosensor. *Proceedings of the National Academy of Sciences, USA* 98(8): 4540-4545. doi: 10.1073/pnas.071375898
- Cardon, Z. G.**, Hungate, B. A., Cambardella, C. A., Chapin III, F. S., Field, C. B., Holland, E. A., and Mooney, H. A. (2001) Contrasting effects of elevated CO₂ on old and new soil carbon pools. *Soil Biology and Biochemistry* 33: 365-373. doi: 10.1016/S0038-0717(00)00151-6
- Cardon, Z.G.** (1995) Influence of rhizodeposition under elevated CO₂ on plant nutrition and soil organic matter. *Plant and Soil* 187(2):277-288.

Publications focused on photosynthesis, transpiration, and desiccation tolerance:

- Massoud EC, Hoffman F, Shi Z, Tang J, Alhajjar E, Barnes M, Braghieri RK, **Cardon ZG**, Collier N, Crompton O, Denny-Frank JK, Gautam S, Gonzalez-Meler MA, Green JK, Levine P, MacBean N, Mao J, Tran Mills R, Mishra U, Mudunuru M, Renchon AA, Scott S, Siirila-Woodburn ER, Sprenger M, Tague C, Wang Y, Xu C, Zarakasz C. Perspectives on Artificial Intelligence for Predictions in Ecohydrology. *Artificial Intelligence for the Earth Systems*. In press.
- Cardon ZG**, Peredo EL, Enloe CM, Oakey JS, Wu S-Z, and Bezanilla M. (2022). Slip slidin' away: bristle-driven gliding by *Tetrademus deserticola* (Chlorophyta) in microfluidic chambers. *Journal of Phycology*. <https://doi.org/10.1111/jpy.13271>
- Peredo EL and **Cardon ZG** (2020) Shared up-regulation and contrasting down-regulation of gene expression distinguish desiccation-tolerant from intolerant green algae. *Proceedings of the National Academy of Sciences USA* 117 (29) 17438-17445. doi:10.1073/pnas.1906904117
- Stark JR, **Cardon ZG**, Peredo EL (2019) Extraction of high-quality, high molecular-weight DNA depends heavily on cell homogenization methods in green microalgae. *Applications in Plant Sciences* 8(3):e11333. doi:10.1002/aps3.1133
- Dohnalkova A and **Cardon Z** (2018) Addressing challenges in ultrastructural TEM imaging of Chlorophyceae (green algae). *Microscopy and Microanalysis* 24(Suppl1) 1346. doi:10.1017/S1431927618007213
- Cardon ZG**, Peredo EL, Dohnalkova AC, Gershon HL, Bezanilla M. (2018) A model suite of green algae within the Scenedesmaceae for investigating contrasting desiccation tolerance and morphology. *Journal of Cell Science* 131: jcs212233 doi: 10.1242/jcs.212233 (Cover image, and paper included in the “Research Highlights” section of issue 131.)
- Lunch, CK, LaFountain, AM, Thomas, S, Frank, HA, Lewis, LA, **Cardon, ZG**. (2013) The xanthophyll cycle and NPQ in diverse desert and aquatic green algae. *Photosynthesis Research* 115:139–151. doi: 10.1007/s11120-013-9846-x
- Cardon, Z.G.**, Gray, D.W., and Lewis, L. A. (2008) The green algal underground – evolutionary secrets of desert cells. *Bioscience* 58(2): 114-122. doi: 10.1641/B580206
- Gray, D.W., Lewis, L.A., and **Cardon, Z.G.** (2007) Photosynthetic recovery following desiccation of desert green algae (Chlorophyta) and their aquatic relatives. *Plant, Cell, and Environment* 30:1240-1255. (Cover image.) doi: 10.1111/j.1365-3040.2007.01704.x
- Gray, D.W., **Cardon, Z.G.**, and Lewis, L. A. (2006) Simultaneous collection of rapid chlorophyll fluorescence induction kinetics, fluorescence quenching parameters, and environmental data using an automated PAM-2000/CR10X data logging system. *Photosynthesis Research* 87:295-301. doi: 10.1007/s11120-005-9010-3
- Zanne, A.E., Lower, S.S., **Cardon, Z.G.**, and Orians, C.M. (2006) ¹⁵N fertilization of tomatoes: vascular constraints vs. tissue demand. *Functional Plant Biology* 33:457-64. doi: 10.1071/FP05299
- Jones, C.S, **Cardon, Z.G.**, and Czaja, A.D. (2003) A phylogenetic view of low level CAM in *Pelargonium* (Geraniaceae). *American Journal of Botany* 90:135-142.
- Hooper, D. U., **Cardon, Z. G.**, Chapin III, F. S., and Durant, M. (2002) Corrected calculations for whole ecosystem measurements of CO₂ flux using the LI-COR 6200 portable photosynthesis system. *Oecologia* 132: 1-11. doi: 10.1007/s00442-002-0870-3

- Lodding, C. C., Behling, J., and **Cardon, Z. G.** (2000) Water relations of *Betula cordifolia* and *Betula allegheniensis* rooted together on landslides in Franconia Notch, NH. *American Midland Naturalist* 143:321-329.
- Tsionsky, M., **Cardon, Z.G.**, Bard, A.J., and Jackson, R.B. (1997) Photosynthetic electron transport in single guard cells as measured by scanning electrochemical microscopy. *Plant Physiology* 113(3):895-901. doi: 10.1104/pp.113.3.895
- Cardon, Z.G.**, Berry, J.A., and Woodrow, I.E. (1995). Fluctuating [CO₂] drives species-specific changes in water use efficiency. *Journal of Biogeography* 22:203-208.
- Jackson, R.B., Luo, Y., **Cardon, Z.G.**, Chiariello, N.R., Sala, O.E., Field, C.B., and Mooney, H. A. (1995). Photosynthesis, growth, and density for the dominant species in a CO₂-enriched grassland. *Journal of Biogeography* 22:221-225.
- Cardon, Z.G.**, Berry, J.A., and Woodrow, I.E. (1994). Dependence of the extent and direction of average stomatal response in *Zea mays* and *Phaseolus vulgaris* on the frequency of fluctuations in environmental stimuli. *Plant Physiology* 105:1007-1013. doi: 10.1104/pp.105.3.1007
- Cardon, Z.G.**, Mott, K.A., and Berry, J.A. (1994) Dynamics of patchy stomatal movements, and their contribution to steady-state and oscillating stomatal conductance calculated with gas-exchange techniques. *Plant, Cell, and Environment* 17:995-1007. doi: 10.1111/j.1365-3040.1994.tb02033.x
- Mott, K.A., **Cardon, Z.G.**, and Berry, J.A. (1993). Asymmetric patchy stomatal closure for the two surfaces of *Xanthium strumarium* L. leaves at low humidity. *Plant, Cell, and Environment* 16:25-34. doi: 10.1111/j.1365-3040.1993.tb00841.x
- Cardon, Z.G.**, and Berry, J.A. (1992). Effects of O₂ and CO₂ concentration on the steady-state fluorescence yield of single guard cell pairs in intact leaf discs of *Tradescantia albiflora*. Evidence for Rubisco-mediated CO₂ fixation and photorespiration in guard cells. *Plant Physiology* 99:1238-1244. doi: 10.1104/pp.99.3.1238
- Cardon, Z.G.**, and Mott, K.A. (1989). Evidence that ribulose 1,5-bisphosphate (RuBP) binds to inactive sites of RuBP carboxylase *in vivo* and an estimate of the rate constant for dissociation. *Plant Physiology* 89:1253-1257. doi: 10.1104/pp.89.4.1253
- Special Journal Issues, Volumes Edited, and Peer-Reviewed Contributions to Edited Volumes:
- Evans-White MA, **Cardon ZG**, Schweitzer JA, Urabe J, Elser JJ. (2019) Editorial: Emerging Frontiers in Ecological Stoichiometry. *Frontiers in Ecology and Evolution*. 7:463. doi: 10.3389/fevo.2019.00463
- Cardon, Z.G.** and Whitbeck, J.L. (eds) (2007) *The Rhizosphere: an Ecological Perspective*. Elsevier, San Diego, CA.
- Whitbeck, J.L. and **Cardon, Z.G.** Introduction. (2007) IN: *The Rhizosphere: an Ecological Perspective*. Cardon, Z.G. and Whitbeck, J.L. (eds). Elsevier, San Diego. Pp. xv-xix.
- Cardon, Z. G.**, and Herron, P. M. Sweeping water, oozing carbon: long distance transport and patterns of rhizosphere resource exchange. (2005) IN: *Vascular Transport in Plants*. Holbrook, N.M. and Zwieniecki, M.A. (eds). Academic Press, San Diego. Pp. 257-276.
- Cottingham, K. L., **Cardon, Z. G.**, D'Antonio, C. M., Dent, C. L., Findlay, S. E. G., Lauenroth, W. K., LoGiudice, K. M., Stelzer, R. S., Strayer, D. L. (2003) Increasing modeling savvy: strategies to advance quantitative modeling skills for professionals within ecology. In: *Models in Ecosystem Science*. 9th Cary Conference volume, Canham, C., Cole, J. and Lauenroth, W., eds. pp. 428-436.

FUNDINGResearch grants:

- DOE Environmental System Science (ESS) Program. “Tidal Triggers and Hot-Spot Switches in Coastal Marshes” **Cardon (PI)**, co-Is Bowen J, Giblin A, Forbrich I, Sulman B, and O’Meara T. 2023-2026. (\$999,724, \$878314 to MBL)
- DOE Environmental System Science (ESS) Program. “Hydraulic redistribution in forests: Spatial and temporal drivers of variation, and consequences for climate feedbacks” Jacobs E. (PI at Purdue), co-Is **Cardon**, Dukes J, Welp L, and Fang Y. 2022-2025. (\$840,000, \$60,000 to MBL)
- DOE Environmental System Science (ESS) Program. “From tides to seasons: How cyclic tidal drivers and plant physiology interact to affect carbon cycling at the terrestrial-estuarine boundary” Forbrich I (PI at MBL), co-Is **Cardon**, Giblin A, Sulman B, and O’Meara T 2021-2024 (\$974,905).
- Bailey Wildlife Foundation, “Developing a novel, low-cost, flexible sensor platform for quantifying environmental conditions using imaging of immobilized dyes.” **Cardon (PI)**. 2020. (\$80,000)
- DOE Environmental System Science (ESS) Program. “Sticky roots — implications of altered rhizodeposition for the fate of rhizosphere mineral–organic matter associations in natural ecosystems” **Cardon (PI)**, Co-Is Keiluweit M, Malmstrom C, and Riley WJ. . 2020-2023. (\$899,931 + \$100,000 to LBNL for associated modeling).
- Gordon and Betty Moore Foundation, Symbiosis in Aquatic Systems Initiative, “Underground Allies: Dynamic Interactions Among Cordgrass (*Spartina alterniflora*) and Sulfur-Cycling Microbes in the Rhizosphere”. **Cardon (PI)**, co-Is Giblin A, Paul B, Peredo EL, Ruff SE. 2020-2023. (\$299,958)
- University of Chicago-MBL-Argonne MicroBiome Center “Desiccation Tolerance in Green Algae from Desert Microbiotic Crust Microbiomes”. **Cardon (PI)**, Co-Is Austin II J and Peredo EL. 2020-2021. (\$9,141 MBL, \$10,838 UChicago)
- Bailey Wildlife Foundation, “Developing a novel, low-cost, flexible sensor platform for quantifying environmental conditions using imaging of immobilized dyes.” **Cardon (PI)**, Zhang X. and Guha S. (UChicago and ANL, co-Is). 2019. (\$80,000)
- NSF Sensors in the Soil (SitS) Program, “EAGER SitS: Developing a Next Generation Modeling Approach for Predicting Microbial Processes in Soil”, Joe Vallino (PI) and **Cardon (co-I)**. Jan 1 2019-Dec 31 2021. (\$300,000)
- DOE Terrestrial Ecosystem Science (TES) Program, “Sticky roots – implications of widespread, cryptic, viral infection of plants in natural and managed ecosystems for soil carbon processing in the rhizosphere.” **Cardon (PI)**, Keiluweit M and Malmstrom C (co-Is). Oct 1 2018 – Sept 30 2019. Recommended (\$294,999).
- DOE Subsurface Biogeochemical Reactions (SBR) Program, “Root Influences on Mobilization and Export of Mineral-Bound Soil Organic Matter.” Keiluweit M (PI UMass Amherst), **Cardon (co-I)**, Oct 1 2018 – Sept 30 2019. Recommended (\$200,000, \$44,000 to MBL).
- DOE Environmental Molecular Sciences Laboratory (EMSL) Science Theme Project 50268, “The Root of the Matter: Soil Carbon Mobilization in the Rhizosphere” Keiluweit, M (PI); **Cardon** and Malmstrom, C (**coPIs**). EMSL : Lipton, Chu. Oct 1 2018 – Sept 30 2020.
- Bailey Wildlife Foundation, “Developing a novel, low-cost, flexible sensor platform for quantifying environmental conditions using imaging of immobilized dyes.” **Cardon (PI)**, Zhang X. and Guha S. (UChicago and ANL, co-Is). 2018. (\$80,000.)

- University of Wyoming, “Wyoming Algae for Unconventional Bioconversion Processes”, J. Oakey (PI), **Cardon (co-I)**, P Stahl(co-I), M Bezanilla(co-I). 2017-2018. \$102,194 MBL.
- Anonymous donor, Quasi-Endowment and Current Use Research Supplements to “Women in Ecological Science” at MBL, 2009-2022. **Cardon (PI)**. ~\$1,924,000.
- DOE JGI Community Science Program, “Protecting photosynthesis during desiccation: do the genomes of desert-derived and aquatic *Scenedesmus* species hold the key to understanding extreme desiccation tolerance among green algae?”, EL Peredo (PI) and **Cardon (co-I)**. 2016-18. Sequencing genomes of related green algae -- two desert and two aquatic.
- DOE Environmental Molecular Sciences Laboratory (EMSL) Science Theme Project, “Does Chloroplast Thylakoid Membrane Organization Influence Desiccation Tolerance in Green Algae?” **Cardon (PI)**. EMSL Co-I: G Orr, EMSL and PNNL. 2015-2017.
- DOE Joint Genome Institute – Environmental Molecular Sciences Laboratory (JGI-EMSL) Collaborative Science, “3D Reality Check: Developing Structural Support for Predicting Microbial Function and Interpreting Microbial ‘Omics’ Data”. **Cardon (PI)**. Co-Is: J Vallino and G Serres. EMSL collaborator: T Scheibe, EMSL, PNNL. 2015-. 2017.
- Anonymous donor, “A novel low-waste, low-maintenance system for microbial generation of methane from algal biomass.” **Cardon (PI)** Co-I J Vallino. 2014 – 2016. \$302,393.
- Environmental Molecular Sciences Laboratory (EMSL) science theme project, "Integration of Pore-Scale Simulations and Multi-Omics Data to Develop Insights into Functional Heterogeneity in Microbial Communities". **Cardon (PI)** Co-Is: J Vallino, G Serres, and computer scientist T Scheibe (EMSL). 2014-2015.
- NSF, “Photoprotection in Diverse, Desiccation-Tolerant, Desert Green Algae and Their Close Aquatic Relatives”; **Cardon (PI)**. 2014-2017. \$629,975
- DOE Terrestrial Ecosystems, “Hydraulic redistribution of water through plant roots – implications for carbon cycling and energy flux at multiple scales”; **Cardon (PI)**, D Gage and G Wang (UConn, Co-Is), R Neumann (Univ. WA, Co-I). 2012-2016. \$1,048,327.
- Brown-MBL Faculty Seed Grant, “Linking long- and short-term controls on terrestrial phosphorus cycling”; **Cardon (PI)**, S Porder and L Schreeg (Brown co-Is). 2011-2012. \$49,949.
- NSF, “Collaborative Research: MSB: The Role of Sulfur Oxidizing Bacteria in Salt Marsh C and N Cycling” ; **Cardon (PI)**, A Giblin (co-I); S Sievert (PI) from WHOI. 8/2011 – 7/2016. \$1,200,326 total (\$510,333 to MBL, \$689,993 to WHOI)
- NASA Exobiology, “Leaping to Land – Physiology and Phylogenetics of Desert Green Algae”, **Cardon (PI)**, L Lewis and H Frank (Co-Is), 2008-2012, \$531,978.
- Anonymous grant, “Hydraulic Redistribution of Water in Western Landscapes: Effects on Plant Fitness and Rhizosphere Function”, **Cardon (PI)**. 3/08. \$300,000.
- DOI USGS Office of Groundwater Research, Branch of Geophysics, “USGS OGW BG-UCONN Cooperative Agreement”, **Cardon (co-I)**. 8/2007-8/2012. \$220,632.
- Connecticut Institute of Water Resources Grant, “Development of a New Generation of Sensitive, Fluorescence-based Nitrate Sensors for Use in Soil and Water”, **Cardon (co-I)** with PI S Burdette. 9/1/07-8/31/09. \$36,994.
- UConn Research Foundation Large Faculty Grant, “Desiccation Tolerance in Desert Green Algae”, **Cardon (PI)**. 1/06 – 1/07. \$16,677.
- NSF DDIG, Population Dynamics Program, “Nitrogen Deposition and Population Dynamics of a Declining Nitrogen-fixing Plant Species”, **Cardon (co-PI)**, co-PI K Skogen (student written proposal) and PI K Holsinger, 6/1/06-7/31/08, \$11,993.

- NSF Ecosystems Program, "Desert Microbial Activity in the Rhizosphere Oasis", **Cardon (PI)**, co-PIs D Gage and J Stark. 2004 – 2007. \$529,625.
 NSF REU supplements, summers of 2005, 2006, 2007, \$6000 each summer.
 NSF International Supplement, with Dr. Vit Gloser, Czech Republic, 2004-2007, \$25,472.
 NSF DDIG, Ecosystems Program, "Dissertation Research: Does Hydraulic Redistribution Increase Microbial Activity in the Rhizosphere?", **Cardon (PI)**, co-PI P Herron (student written proposal), 2004-2006, \$12,000.
 NASA Exobiology, "Phylogenetic diversity and comparative physiology of independently-evolved lineages of desert green algae (Chlorophyta)", L.A. Lewis, PI, **Cardon (co-PI)**, 2003-06 \$380,876.
 NSF Ecosystems Program, SGER, "Developing a New Miniaturized Sensor for Detecting Glucose in Soil", **Cardon (PI)**, F. Moussy (co-PI), 5/02-5/03, \$25,053
 UConn Research Foundation Large Faculty Grant, "Effect of tillage and carbon input levels on soil organic carbon distribution" **Cardon (PI)**, T. Morris (co-I). 1/01-1/02, \$7881
 Andrew W. Mellon Foundation Grant, "Carbon fluxes from plant roots to soils -- how timing, quality, and quantity of fluxes affect rhizosphere microbial activity." **Cardon (PI)** 3/00-12/04, \$350,000
 UConn Research Foundation Large Faculty Grant, "Does Plant Phenology Influence Microbial Activity in the Rhizosphere?" **Cardon (PI)**, 6/98-5/99, \$17,609
 Andrew W. Mellon Foundation Grant, "Influence of Root Exudation and Rhizodeposition on Rhizosphere Processes in Natural Soils." **Cardon (PI)**, 4/96-12/99, \$180,000

Teaching and Graduate Training Grants:

- NSF IGERT, "Reverse Ecology: Computational Integration of Genomes, Organisms and Environments", D Rand (PI), ZG **Cardon**, M Sogin, A Schmitt, & S Istrail (**co-Is**), \$2,920,540, 8/2010-8/2015 (extended to 2016)
 NSF Instrumentation and Laboratory Improvement, "Analytical and Quantitative Understanding of Integrative Plant Biology through Coursework and Independent Student Research" **Cardon (PI)** 6/97-6/00, \$17,520
 UConn Institute for Teaching and Learning Grant, "Biology as a quantitative science--easing the path to computational ability and conceptual thinking." **Cardon (PI)** 6/99, \$6000

SELECTED SERVICE ON MBL COMMITTEES

MBL strategic planning:

- Search committee, Ecosystem Center, coastal ecosystems faculty cluster search (2020-2021)
 Science Council (elected, 2010 – 2013, 2014 - 2021) Advisory committee to the MBL Director on research and education strategy at the MBL.
 Steering Committee, Imaging Innovation Initiative (2018 – ongoing)
 Search committees, Bay Paul Center faculty search, 2008, 2009, 2019
 Search committees, Bell Center faculty searches, 2011, 2018
 Co-Leader (appointed), "PRO-Microbes" vision meeting (23 invited attendees, 9 from MBL).
 New research and education linking dynamic microbial response with shifting ecosystem function over ecological and evolutionary time scales. (2015)
 Co-Leader (appointed), MBL "Vision Team IV: Microbial diversity, ecology, evolution and microbiomes" (12 invited attendees, 5 from MBL, 5 from University of Chicago).
 Development of new strategic MBL theme in research and education focused on microbiomes. (2015)

Institutional Committee (appointed 2009 – 2010) (Advisory committee to the MBL Director on resident research at the MBL)

Implementation -University of Chicago affiliation:

MBL Affiliation Committee (appointed 2014) (guidance for new MBL-UChicago affiliation)
Head (appointed), Organizing Committee, first UChicago-MBL faculty retreat (2014)

Day-to-day operations: MBL Research Services (2013 -2019); MBL Biosafety (2009 - ongoing); Head, Ecosystems Center Facilities (2009 - 2019); Head, MBL Research Greenhouse (2009 - ongoing); Stable Isotope Laboratory (2008 - 2023); Friday Evening Seminar speaker series planning committee (2017 - 2019); Weekly seminar organizer, Ecosystems Center (Fall 2008, Fall 2009, Spring 2010)

TEACHING

Marine Biological Laboratory, Woods Hole, MA

Co-Organizer and webmaster, MBL “MicroEco” discussion group, a cross-Center group exploring links between microbial activity, diversity and ecosystem function (2008 – ongoing; http://ecosystems.mbl.edu/mbl_micro_eco/)

Semester in Environmental Science (fall 2011-ongoing).3-4 lectures each fall, two laboratory weeks, and supervision of 1-3 independent student research projects over 5 weeks each year. The SES program (<http://www.mbl.edu/ses/>) is a hands-on field- and lab-intensive semester course, drawing up to 24 juniors and seniors from over 60 colleges & universities.

Organizer, weekly “Chlorophyll Fluorescence” discussion group at MBL & WHOI, examining information chlorophyll fluorescence can give about photosynthetic activity (2009 – 2010)

UChicago

BIOS 27720: Microbiomes Across Environments. One-hour lecture, Sept. 2018.

BIOS 27720: Microbiomes Across Environments. One-hour lecture, Sept. 2017.

Invited contributor , third annual Quantitative Methods in Biology Bootcamp at MBL, for incoming biological sciences graduate students at the University of Chicago. Sept. 2017.

BIOS 15123 – The Microbiome in Human and Environmental Health. One lecture, at UChicago, May, 2016.

Invited contributor, first annual Quantitative Methods in Biology Bootcamp at MBL, for all incoming biological sciences graduate students at the University of Chicago. Sept. 2015.

Brown-MBL

Co-taught (with Dr. David Rand, Brown Univ.) the IGERT “Core Course” for the Brown-MBL graduate training grant: “Reverse Ecology – Computational Integration of Genomes, Organisms, and Environments”. (2011-2017). Intensive, year-long core course required of all incoming graduate students, immersing them in the ecology and history of an ecosystem and genomic techniques to be used to answer ecological and evolutionary questions.

Participant in graduate Phenology seminar, EEB Department, Brown Univ., fall 2009.

University of Connecticut, regularly taught (1996-2007):

Introductory Biology (~300 first year students);

General Ecology “W” (~70-100 sophomores/juniors, writing intensive);

Organisms and Ecosystems (~10-20 seniors and graduate students);

Soil Degradation and Conservation (~10-15 seniors and graduate students)
Integrative Earth System Science (~6-10 graduate students, developed and taught this writing intensive core course for first-year students in the new interdisciplinary Center for Integrative Geosciences that Cardon helped to found in 2004.)

University of Connecticut, irregularly taught (1996-2007):

Introduction to Undergraduate Research (~25-60 students)
Professional Development Seminar (~15 graduate students)
Seminar on The Rhizosphere; Seminar on Plant Evolution; Seminar on Plant Ecology; Seminar on Plant Water Relations (~10-15 graduate students each)
Multiple independent study courses one-on-one with undergraduate and graduate students

Harvard University (fall, 2002):

Soil Degradation and Conservation (as Hrdy Fellow in Conservation Biology, OEB Dept.)

TRAINING

Postdoctoral Advisor:

Sherlynette Pérez Castro (MBL 2020 -). PhD 2018 from the Joint Doctoral Program in Ecology, San Diego State University-University of California, Davis.
Elena Lopez Peredo (MBL 2014 - 2018). PhD 2008 from University of Oviedo. Fulbright Scholar 2010-2012, University of Connecticut. Research Associate, MBL, 2018-2023. Rochester Institute of Technology Assistant Professor (2023-).
Or Shapira (MBL 2014-2016). Visiting postdoc from Robert H. Smith Institute of Plant Science and Genetics in Agriculture, The Hebrew University of Jerusalem, Israel. PhD 2013 from The Hebrew University of Jerusalem.
Laura Schreeg (Brown-MBL 2011 – 2013, co-advisor with Stephen Porder). PhD 2011 from University of Florida. AAAS Science and Technology Postdoctoral Fellow 2013-2015. Now Agricultural Resource Specialist at U.S. Department of Agriculture (USDA) and U.S. Agency for International Development (US AID), Washington, DC.
Claire Lunch (MBL 2009-2012). PhD 2009 Stanford University. Now Staff Scientist, Plant Physiology, Neon, Inc. Boulder, CO.
Dennis Gray (UConn 2004-2007) PhD 2003 from SUNY Stonybrook. Associate Professor of Biology, Saginaw Valley State University, University Center, MI. Deceased.
Catalina Arango Pinedo (UConn 2007). PhD 2000 from UMass Amherst. Now Associate Professor, Department of Biology, Saint Joseph's University, Philadelphia, PA.
Pati Vitt (UConn 1998-1999). PhD UConn 1998. Now Susan and Roger Stone Curator, Dixon National Tallgrass Prairie Seed Bank Conservation Scientist, Chicago Botanic Garden; and Adjunct Assistant Professor, Northwestern University.
Jon Behling (Bowdoin College 1996-1997). Now organic farmer in Wisconsin.

Graduate Major Advisor, Department of Ecology and Evolutionary Biology, UConn:

Patrick Herron, PhD 2007. NSF DDIG recipient and EPA STAR Fellow. Now Executive Director, Mystic River Watershed Association. Arlington, MA.
Bethanie Hooker, PhD 2006. EPA STAR Fellow and PEO Scholar. Now Senior Manager, Water and Agriculture Resilience at Ceres, Inc. Cambridge, MA.
Tracy Gartner, PhD 2004. NSF Graduate Research Fellow. Now Director, Environmental Science Program; Professor of Environmental Science and Biology. Carthage College, Kenosha, WI.

Graduate Major Co-Advisor, Center for Integrative Geosciences, Univ. of Connecticut:

David Hoover. MS 2008. Now Research Ecologist/Ecohydrologist, USDA-ARS Rangeland Resources & Systems Research: Fort Collins, CO

Note: MBL personnel serve on graduate committees but are not sole major advisors for graduate students, though MBL is formally affiliated with University of Chicago.

Graduate Committee Member, Various Institutions

Isabella Hrabe de Angelis (Max Planck Institute for Chemistry, PhD expected 2023)

Joseph Vineis (Northeastern University, PhD 2022) Now Postdoctoral Researcher, Princeton University, New Jersey.

Brooke Osborne (Brown University, PhD 2019) Now Assistant Professor, Utah State University.

Bo Pietraszkiewicz (University of Connecticut, PhD 2010)

Kristina Catanese (University of Connecticut, MS 2009)

Shirley Micallef (University of Massachusetts, Boston, PhD 2008) Now Associate Professor, Plant Science and Landscape Architecture, University of Maryland.

Krissa Skogen (University of Connecticut, PhD 2008), Now Associate Professor, Clemson University, Clemson South Carolina.

Lindsay Bowerman (University of Connecticut, MS 2007)

Krista Fisk (University of Connecticut, MS 2007)

Courtney Hamler Zabadka (University of Connecticut, MS 2007) Now Visiting Lecturer, Westfield State University, MA, and Lecturer, Eastern Connecticut State University, CT.

Robin Kodner (Harvard University, PhD 2007) Now Associate Professor at Western Washington University, Biology Department.

Sarina Lambert (University of Connecticut, MS 2007)

Corie Cann (University of Connecticut, MS 2006)

Stacey Leicht (University of Connecticut, PhD 2006)

Nava Tabak (University of Connecticut, MS 2005) Now Natural Resource Director at Baxter State Park, Maine.

Robert Dunn (University of Connecticut, PhD 2003) Now William Neal Reynolds Distinguished Professor, Applied Ecology, NC State University.

Michael Gavin (University of Connecticut, PhD 2003) Now Professor, Warner College of Natural Resources, Colorado State University.

Nancy Ryan (University of Connecticut, MS 2003)

David Bryant (University of New Hampshire, PhD 2002) Now Owner, Fangorn Productions llc, Ipswich, MA.

Graduate Qualifying Exam Committee Member at Brown:

Susanna Theroux (PhD 2012) Now Senior Scientist, Southern California Coastal Water Research Project

Post-undergraduate trainees:

Jordan Stark (MBL research assistant 2017-current.) Research produced Stark et al. (2019). Now master's student, Syracuse University. Biology Dept.

Elizabeth Forbes (MBL research assistant 2012-2014. Now PhD student at University of California, Santa Barbara, CA.

Jennifer Funk (UConn RA 1997-1999). Research contributed to *Oecologia* publication Cardon et al (2002). Now Associate Professor, Dept. of Plant Sciences, UC Davis, CA.

Undergraduate lab trainees:

At MBL:

Danya Hammoudeh (Xavier University) SES independent project advisor (2022)
Grady Welsh (Middlebury College) SES independent project advisor (2022). Goldwater Scholarship 2023.
Ross Brown (University of Virginia) Maxwell-Hanrahan Foundation summer research fellow (2022). Fullbright Fellowship (Germany) 2023.
Ella Lemley-Fry (Lawrence University) SES independent project advisor (2021)
Kathryn Hulleman (Earlham College) SES independent project advisor (2019)
Anthony DiGiovanni (Clarkson Univ.) SES independent project advisor (2018)
Hannah Gershone (Mt. Holyoke) SES independent project advisor (2016); research contributed to *Journal of Cell Science* publication Cardon et al. (2018) .
Emily Geoghegan (Bryn Mawr) SES independent project co-advisor with Joe Vallino (2015)
Caroline Kanaskie (Dickinson College) SES independent project advisor (2015)
Tinsley Galyean (Hampshire College) SES independent project advisor (2015)
Ruby An (Univ. of Chicago Metcalf program), co-advisor with Joe Vallino (2015). Now Research Assistant, Univ. of Chicago.
Hansen Johnson (Bates College), co-advised SES project with Ed Rastetter (2011) Now graduate student, Dalhousie University, Department of Oceanography.
Adrien Hansen (Bowdoin College), co-advised with Anton Post (2011)
Jed Rasmussen (REU through UConn, graduate of Utah State University, 2008) Now Associate Professor, Biology, Snow College, Ephraim, Utah.
Kristina Catanese, UConn honors thesis (2008)

At UConn:

David Hoover, undergraduate and master's degrees, now Research Ecologist at USDA-ARS, Fort Collins, CO)
Naomi Avery
Corie Cann, UConn BS/MS program in Conservation Biology
Andrew Czaja, honors (NSF and NDSEG graduate fellow). Now Associate Professor, University of Cincinnati, Dept. of Geology.
Jeremy Draghi (NSF graduate fellowship honorable mention) Now Assistant Professor, Virginia Polytechnic Institute and State University, Dept. of Biological Sciences.
Matthew Dunn, honors thesis
Laura Pustell
Kristen Riley

Bowdoin:

Cynthia Lodding, honors thesis published in *American Midland Naturalist*. Now physician.
Erika Kiers, now University Research Chair and Professor at Vrije Universiteit, Amsterdam

Multiple other undergraduates for shorter-term projects, at Bowdoin, UConn, and MBL.