

Justin L. Penn

Department of Geosciences,
Princeton University
Guyot Hall
Princeton, NJ 08544

Email: jpenn@princeton.edu
Website: <https://jlpenn.github.io/index.html>
Tel: (310) 871-3051

Education

- 2020** ***PhD, Oceanography***
University of Washington, Seattle
Advisor: Curtis Deutsch
Dissertation title: “Biosphere Impacts of Ocean Hypoxia in Warming Climate”
- 2016** ***MS, Oceanography***
University of Washington, Seattle
- 2012** ***BS, Environmental Science***
Conservation Biology Minor
University of California, Los Angeles
Magna Cum Laude

Research Interests

Climate change, marine ecosystems, ocean biogeochemistry, biodiversity, extinction, nitrogen cycle, hypoxia, paleobiology, Earth system modeling, paleoclimate, O₂ dynamics, ecophysiology, metabolic theory, ecological interactions, biogeography.

Publications

Penn. J. L., Deutsch C., Geographic and taxonomic patterns in aerobic traits of marine ectotherms. *Philos. Trans. Roy. Soc. B* (2024) 379 (1896), 20220487.

Endress M. A., **Penn J. L.**, Boag T. H., Burford B. P., Sperling E. A., Deutsch C. Thermal optima in the hypoxia tolerance of marine ectotherms: physiological causes and biogeographic consequences. *PLOS Biology* (2024) 22 (1), e3002443.

Deutsch C., **Penn J. L.**, Lucey N. Climate, oxygen, and the future of marine biodiversity. *Annual Review of Marine Science* (2024) 16, 217-245.

Payne J. L., Al Aswad J. A., Deutsch C. A., Monarrez P. M., **Penn J. L.**, Singh P., Selectivity of mass extinctions: patterns, processes, and future directions. *Cambridge Prisms: Extinction* (2023).1,e12,1–11 <https://doi.org/10.1017/ext.2023.10>

Deutsch C., **Penn J. L.**, Verbek W. C. E. P., Inomura K., Endress M., Payne J. L. Impact of warming on aquatic body sizes explained by metabolic scaling from microbes to macrofauna. *Proceedings of the National Academy of Sciences*. 119 (2022). <https://doi.org/10.1073/pnas.2201345119>

Penn J. L., Deutsch C., Avoiding ocean mass extinction from climate warming. *Science*. 526, 524-526 (2022). doi:10.1126/science.abe9039

C. Deutsch, **Penn J. L.**, Seibel B., Metabolic trait diversity shapes marine biogeography. *Nature*. 585 (2020), doi:10.1038/s41586-020-2721-y.

Howard E. M., **Penn J. L.**, Frenzel H., Seibel B. A., Bianchi D., Renault L., Kessouri F., Sutula M. A., McWilliams J. C., Deutsch C., Climate-driven aerobic habitat loss in the California Current System, *Science Advances*. 6 (2020), doi: 10.1126/sciadv.aay3188

Penn J. L., Weber T., Chang, B. X., Deutsch C., Microbial ecosystem dynamics drive fluctuating nitrogen loss in marine anoxic zones. *Proceedings of the National Academy of Sciences*. 16 (2019), <https://doi.org/10.1073/pnas.1818014116>

Penn J. L., Global warming blamed for Earth's largest mass extinction. *The Science Breaker*. (2019). <https://doi.org/10.25250/thescbr.brk277>

Penn J. L., Deutsch C., Payne. J. L., Sperling E.A., Temperature-dependent hypoxia explains biogeography and severity of end-Permian marine mass extinction. *Science*. 362 (2018), <https://doi.org/10.1126/science.aat1327>

Penn J. L., Weber T., Deutsch C., Microbial functional diversity alters the structure and function of oxygen deficient zones. *Geophysical Research Letters*. 43 (2016), doi:10.1002/2016GL070438.

Professional Experience

July 2021 – Present	Postdoctoral Research Associate Department of Geosciences Princeton University
Feb. – July 2021	Postdoctoral Scholar School of Oceanography University of Washington, Seattle
2014 – 2020	Graduate Research Assistant School of Oceanography University of Washington, Seattle
2015 – 2017	Teaching Assistant Ocean 215: Methods of Oceanographic Data Analysis in Python School of Oceanography University of Washington, Seattle
2013 – 2014	Research Scientist & Engineer School of Oceanography University of Washington, Seattle
2012 – 2013	Research Assistant Department of Atmospheric and Oceanic Science University of California, Los Angeles
2012	Research Intern Institute of the Environment and Sustainability, Institute of Geophysics & Planetary Physics University of California, Los Angeles

Research Grants

2022 - 2025	Geophysical Fluid Dynamics Laboratory (GFDL) & Cooperative Institute for Modeling the Earth System (CIMES) Task III project; “Development and parametrization of a trait-based model of zooplankton diversity for marine food web and climate feedback studies” (Co-PI)
2018	Program on Climate Change Fellowship, UW

Highlights, Honors, and Awards

- 2022** *Science* Perspective by Malin Pinsky and Alexa Fredston on “Avoiding ocean mass extinction from climate warming.”
- 2019** Ocean Carbon and Biogeochemistry Science Highlights: “Microbial ecosystem dynamics drive fluctuating nitrogen loss in marine anoxic zones”
- 2018** *Science* Perspective by Lee Kump on “Temperature-dependent hypoxia explains biogeography and severity of end-Permian marine mass extinction”
- 2016** Modeling a Living Planet Travel Scholarship, Princeton University
- 2015 – 2019** National Center for Atmospheric Research (NCAR) Computing Allocation
- 2013** Phi Beta Kappa, UCLA
- 2012** California Sea Grant Isaacs Scholarship
- 2012** Departmental Academic Achievement Award, Institute of the Environment and Sustainability, UCLA
- 2012** Departmental Highest Honors, Institute of the Environment and Sustainability, UCLA

Talks, Presentations, and Conferences

- 2024** GSA Connects, Anaheim, CA; Climate, trait adaptation, and marine extinction patterns of the Paleocene-Eocene Thermal Maximum (Talk)
- 2024** ESA Annual Meeting, Long Beach, CA; Hypoxic storms promote species coexistence through competition on a tropical reef (Talk)
- 2024** School of Earth Sciences and Engineering, Nanjing University, China. Climate warming and ocean hypoxia as drivers of end-Permian marine mass extinction: Implications for the future of biodiversity (*Invited seminar*)
- 2024** Workshop on Earth’s Evolution and Global Carbon Cycle, School of Earth Sciences and Engineering, Nanjing University, China; Climate warming and ocean hypoxia as drivers of end-Permian marine mass extinction: Implications for the future of biodiversity (*Invited Talk*)

- 2024** Ocean Sciences Meeting, New Orleans, LA; Geographic and taxonomic patterns in aerobic traits of marine species (*Talk*)
- 2022** Geological Society of America Connects, Denver, CO; Avoiding ocean mass extinction from climate warming (*Invited talk*)
- 2022** GENIE Symposium: Applications of the cGENIE (muffin) Earth System Model. University of California, Riverside (*Attendee*)
- 2020** PhD Defense: University of Washington, Seattle. Marine extinction risk from climate warming: past to future (*Lecture*)
- 2020** Program on Climate Change Winter Symposium, University of Washington, Seattle. Marine Extinction Risk from Climate Warming. (*Talk*)
- 2020** AAAS Annual Meeting, Seattle. Marine Extinction Risk from Climate Warming. (*Talk*)
- 2019** Oceanography graduate and postdoc symposium: University of Washington, Seattle. Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Poster*)
- 2019** Chemical Oceanography seminar: University of Washington, Seattle. Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Lecture*)
- 2018** Paleobiology seminar: University of Washington, Seattle. Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Lecture*)
- 2018** Gordon Research Conference: Global Change Biology, NH: Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Poster*)
- 2018** Gordon Research Seminar: Global Change Biology, NH: Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Talk*)
- 2017** Geological Society of America, Seattle, WA: Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Talk*)
- 2017** Ocean Science Meeting, Portland, OR: Temperature-dependent hypoxia explains end-Permian extinction in the oceans. (*Talk*).
- 2016** American Geophysical Union Fall Meeting, San Francisco,

CA: Aerobic marine habitat loss during the Late Permian extinction. (*Poster*)

2016 Modeling a Living Planet: Princeton University, NJ: Microbial ecosystem dynamics in marine O₂ minimum zones. (*Poster*)

2016 Program on Climate Change Summer Institute: The Climate of Antarctica and the Southern Ocean, Friday Harbor, WA. (*Attendee*).

2014 American Geophysical Union Fall Meeting, San Francisco, CA: Microbial competition for N intermediates drives oscillating N loss from marine oxygen deficient zones. (*Talk*)

2014 Gordon Research Conference: Marine Microbes, Boston, MA: Modeling microbial ecosystem dynamics in marine anoxic zones. (*Poster*)

Outreach and Service Activities

Communicating research findings to the public is a key part of increasing science accessibility and spreading awareness about climate change impacts. For my work on extinction, I've had the opportunity to convey my results to a broad audience by speaking with reporters, which led to coverage in >300 news outlets, including [National Geographic](#), [New York Times 1](#), [2](#), [The Atlantic](#), [The Gaurdian 1](#), [2](#), [Scientific American](#), [The Independent](#), [Business Insider](#), [Forbes](#), [Seattle Times](#), [Smithsonian](#), [Newsweek](#), [Washington Post](#), [GeekWire](#), [Science News](#), [The Scientist](#), [Grist](#), [Mother Jones](#), [The Stranger](#), [My Northwest](#), [Futurity](#), [Seattle Met](#), [Yahoo!](#), [MSN](#), [NBC](#), [Gizmodo](#), [Bloomberg](#), [Wired](#), [USA today](#).

2024 **Guest lecturer**, School of Earth Sciences and Engineering, Nanjing University, China

2022 **Radio Guest**
CBS News Radio L.A.
[Radio Ecoshock with Alex Smith](#) (106 stations)

2018 **Climate consultant** for Governor Jay Inslee, Washington State Capitol, Olympia, WA

2018 **Radio Guest**
["The Record" with Bill Radke, KUOW \(NPR\), Seattle, WA](#)
[BBC Radio 5 Live "Up All Night"](#)

[The "Texas Standard", KUT \(NPR\)](#)

[The Paper Boys Podcast, UW, Seattle](#)

2018 [Video Interview](#) with Andrew Buncombe for The Independent

2017 **Guest Lecturer**, Seattle University, Seattle, WA, ATM S220: Mass Extinctions

Reviewer of journal articles in: Geophysical Research Letters, Marine Chemistry, Environmental Research Letters, Nonlinear Dynamics

Fieldwork

**Dec. 2016-
Jan. 2017** R/V Sikuliaq, Eastern Tropical North Pacific, ARGO float deployment, zooplankton and nutrient sampling, algorithm development for CTD O₂ sensor

Summer 2012 R/V Yellowfin, San Pedro Ocean Time-series (SPOT), Phytoplankton and nutrient sampling

Summer 2012 California Sea Grant Vessel, Santa Monica Bay Observatory (SMBO), Phytoplankton and nutrient sampling