

# William Randolph Shoemaker

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NSF Postdoctoral Fellow

The Abdus Salam International Centre for Theoretical Physics

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## Education

**Indiana University Bloomington**

2014-2020

Ph.D., Major: Biology – Evolution, Ecology, and Behavior Program

Minor: Bioinformatics

Advisor: Dr. Jay T. Lennon

**James Madison University**

2010-2014

B.S., Major: Biology

Advisor: Dr. Reid N. Harris

## Professional Experience

**The Abdus Salam International Centre for Theoretical Physics (ICTP)**

NSF Postdoctoral Fellow, Quantitative Life Sciences

2022 - Present

Advisor: Dr. Jacopo Grilli

**University of California, Los Angeles**

NSF Postdoctoral Fellow, Department of Ecology and Evolutionary Biology

2020 - 2022

Advisor: Dr. Nandita R. Garud

## Preprints and In Review

**Shoemaker, W.R.** A macroecological perspective on genetic diversity in the human gut microbiome. bioRxiv doi: <https://doi.org/10.1101/2022.04.07.487434> (2022).

Wolff, R., **W.R. Shoemaker**, and N.R. Garud. Ecological Stability Emerges at the Level of Strains in the Human Gut Microbiome. bioRxiv doi: <https://doi.org/10.1101/2021.09.30.462616> (2021).

## Publications

**Shoemaker, W.R.**, E. Polezhaeva, K.B. Givens, and J.T. Lennon. Seed Banks Alter the Rate and Direction of Molecular Evolution in *Bacillus subtilis*. *Genetics*. **iyac071** (2022).

**Shoemaker, W.R.** & J.T. Lennon. Predicting Parallelism and Quantifying Divergence in Microbial Evolution Experiments. *mSphere*. **e00672-21** (2022).

Hughey, M.C., E.A. Rebollar, R.N. Harris, R. Ibáñez, S.C. Loftus, L.L. House, M.C. Bletz, D. Medina, M.K. Riley, **W.R. Shoemaker**, M.C. Swartwout, and L.K. Belden. An experimental test of disease resistance function in the skin-associated bacterial symbiont communities of three tropical amphibian species. *FEMS Microbiol. Ecol.* 98, fiac023 (2022).

**Shoemaker, W.R.,** D. Chen, and N.R. Garud. Comparative Population Genetics in the Human Gut Microbiome. *Genome Biol. Evol.* **14**, evab116 (2022).

**Shoemaker, W.R.,** S.E. Jones, M.E. Muscarella, M.G. Behringer, B.K. Lehmkuhl, and J.T. Lennon. Microbial population dynamics and evolutionary outcomes under extreme energy-limitation. *Proc. Natl. Acad. Sci. U.S.A.* **118**, 33 (2021).

**Shoemaker, W.R.,** E. Polezhaeva, K.B. Givens, & J.T. Lennon. Molecular evolutionary dynamics of energy-limited microorganisms. *Mol. Biol. Evol.* **38**, 4532–45 (2021).

Long, H., W. Sung, S. Kucukyildirim, E. Williams, S. Miller, W. Guo, C. Patterson, C. Gregory, C. Strauss, C. Stone, C. Berne, D. Kysela, **W.R. Shoemaker,** M. Muscarella, H. Luo, J.T. Lennon, Y.V. Brun, & M. Lynch. Evolutionary determinants of genome-wide nucleotide composition. *Nat. Ecol. Evol.* **2**, 237–240 (2018).

**Shoemaker, W.R.,** & J.T. Lennon. Evolution with a seed bank: the population genetic consequences of microbial dormancy. *Evol. Appl.* **11**, 60–75 (2018).

Kuo, V., **W.R. Shoemaker,** M.E. Muscarella, & J.T. Lennon. Whole genome sequence of the soil bacterium *Micrococcus* sp. KBS0714. *Genome. Announc.* **5**, e00697–17 (2017).

**Shoemaker, W.R.,** K.J. Locey, & J.T. Lennon. A macroecological theory of microbial biodiversity. *Nat. Ecol. Evol.* **1**, 0107 (2017).

Rebollar, E.A., S.J. Simonetti, **W.R. Shoemaker,** & R.N. Harris. Horizontal and Pseudo-environmental Transmission of the Antifungal Probiotic Bacterium *Janthinobacterium lividum* on Green Frog (*Lithobates clamitans*) Tadpoles. *Appl. Environ. Microbiol.* **82**, 2457–2466 (2016).

**Shoemaker, W.R.,** M.E. Muscarella, & J.T. Lennon. Genome Sequence of the Soil Bacterium *Janthinobacterium* sp. KBS0711. *Genome. Announc.* **3**, e00689–15 (2015).

## Grants

Graduate Research Excellent Grant (GREG). Society for the Study of Evolution Rosemary Grant Advanced Award. PI: W.R. Shoemaker, co-PI: J.T. Lennon. \$3,472. 2018.

NASA Astrobiology Early Career Collaboration Award. *Microbial dormancy and adaptation to energy-limitation*. PI: W.R. Shoemaker, co-PIs: J.T. Lennon, V. Orphan. \$5,000. 2017.

SSE Education & Outreach Committee Grant. *Generating a novel summer course in evolutionary biology for Indiana high school students*. PI: L. Cole, co-PIs: W.R. Shoemaker, D. Schwab. \$1,000. 2017.

## Fellowships, Honors, and Awards

Postdoctoral Research Fellowship in Biology. National Science Foundation. 2020 - Present

Floyd Microbiology Fellowship, Indiana University, Bloomington, IN, USA. 2016, 2017, 2019

Louise Constable Hoover Fellowship, Indiana University, Bloomington, IN, USA. 2017

The Women's Welsh Clubs of America Scholarship, Rocky River, OH 2014–2020

## Talks and Posters

**Shoemaker, W.R.**, Polezhaeva, E., Givens, K.B., & Lennon, J.T. Seed banks alter the molecular evolutionary dynamics of *Bacillus subtilis*. American Physical Society March Meeting, Chicago, Illinois, USA (2022).

**Shoemaker, W.R.**, Locey, K.J., & Lennon, J.T. Connecting Global Biodiversity Predictions to Molecular Thermodynamics. Boston University Theory in Biology, Boston, Massachusetts, USA (2018).

**Shoemaker, W.R.** & Lennon, J.T. Dormancy Constrains the Rate and Direction of Adaptive Evolution. Population, Evolutionary and Quantitative Genetics Conference, Madison, Wisconsin, USA (2018).

**Shoemaker, W.R.** & Lennon, J.T. The contribution of dormancy to microbial evolution. Society for Molecular Biology and Evolution, Austin, Texas, USA (2017).

**Shoemaker, W.R.** & Lennon, J.T. The genetic structure of energy limited populations. International Society of Microbial Ecology, Montreal, Quebec, Canada (2016).

**Shoemaker, W.R.**, Locey, K.J., & Lennon, J.T. Constraint-based predictions for the distribution of abundances of microorganisms. Midwest Ecology and Evolution Conference, Bloomington, Indiana, USA (2015).

## Invited seminars

[MicroSeminar](#).

2020

## Organizer: Symposia, Workshops, Conferences, Reading groups

Evolutionary Genetics in Natural Microbial Populations (Co-organized with Nandita R. Garud and Michael J. McDonald). Society for Molecular Biology and Evolution (2021).

Quantitative Experimental Approaches in Microbial Evolution and Ecology. World Microbe Forum (2021).

Microbial Evolutionary Dynamics Reading Group. Indiana University, Bloomington, IN, USA. 2018.

Quantitative Evolutionary Dynamics Reading Group. UCLA, Los Angeles, CA, USA. 2020-2021

Environmental Genomics Group. Indiana University, Bloomington, IN, USA. 2015-2017

## Participant: Workshops, Roundtables, Synthesis Groups

Microbial Interactions at Multiple Scales. Santa Barbara Advanced School Of Quantitative Biology. Kavli Institute for Theoretical Physics. University of California, Santa Barbara. USA (2021).

Quantitative Approaches in Ecosystem Ecology. International Centre for Theoretical Physics. Trieste, Italy (2020).

Evolutionary Quantitative Genetics 2016. National Institute for Mathematical and Biological Synthesis (NIMBioS). University of Tennessee, Knoxville, USA (2016).

Anvi'o workshop. University of Montreal, Montreal, Quebec, Canada (2016).

## Teaching and Mentorship

**Mentor.** Undergraduate honors thesis. Sarah Bald (now Ph.D. student at Boston University).  
*UCLA.* 2021-2022

**Mentor.** Bruins-In-Genomics (B.I.G.) Summer Undergraduate Research Program. *UCLA.* Summer 2021

**Associate Instructor.** BIOL-L 111 Foundations of Biology: Diversity, evolution, and ecology.  
*Indiana University.* Fall 2014, 2019, Spring 2020

**Associate Instructor.** BIOL-L 113 Biological Laboratory. *Indiana University.* Fall 2018

**Associate Instructor.** BIOL-L 318 Evolution. *Indiana University.* Spring 2018

**Co-Instructor.** BIOL-Z 620 [Quantitative Biodiversity](#). *Indiana University.* Spring 2017

**Undergraduate and NSF REU STEM Mentor** *Indiana University.* 2015 – 2018

Undergraduate Mentees: Peyton Thomas, Jessica Zellinger

Summer REU Program: Jared Brewer

## Public Outreach

**Volunteer.** Letters to a Pre-Scientist. 2018 - 2022

**Volunteer.** Skype a Scientist. 2019 - Present

**Organizer and co-Instructor.** [Foundations in Science and Mathematics](#). 2016 – 2018

**High School STEM Mentor** Summer 2015

Jim Holland Summer Science Research Program

High School Mentee: Dakayla Calhoun

**Science Radio Hour & Journal Club Host** 2012-2014

“Disentangling the Bank” WXJM Harrisonburg 88.7 FM

## Professional Service

**UCLA Postdoc Union Leadership Committee**, UAW 5810. 2020 - Present

**EEB representative**, Indiana Graduate Workers Coalition. 2018-2020

**Reviewer:** mBio, Applied and Environmental Microbiology

## Professional Society Membership

American Physical Society (APS)

American Society of Microbiology (ASM)

Genetics Society of America (GSA)

Society for the Study of Evolution (SSE)

Society for Molecular Biology and Evolution (SMBE)