

Benjamin L. Rice

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Education and Training

PRINCETON UNIVERSITY , Princeton, NJ	
Associate Research Scholar, High Meadows Environmental Institute	2022-present
Presidential Postdoctoral Research Fellow, Department of Ecology and Evolutionary Biology	2019-2022
HARVARD UNIVERSITY , Cambridge, MA	2013-2019
PhD, Department of Organismic and Evolutionary Biology	
Graduate School of Arts and Sciences Prize Fellowship	
ARIZONA STATE UNIVERSITY , Tempe, AZ	2008-2012
Bachelor of Science, Microbiology, Minor in Global Health	
Summa cum laude (GPA 4.0) and graduate of Barrett, The Honors College	

Academic Awards and Fellowships

Presidential Postdoctoral Research Fellowship (\$166,000) <i>Princeton University program to support scholars who contribute to the University's diversity (2019-2022)</i>	
Certificate of Distinction in Teaching, Office of Undergraduate Education, Harvard University <i>Department of Organismic and Evolutionary Biology (2018-2019)</i>	
Graduate School of Arts and Sciences Prize Fellowship (\$216,000) <i>Harvard University (2013-2019)</i>	
James Mills Peirce Fellowship (\$18,000) <i>Harvard University (2013-2016)</i>	
Postbaccalaureate Scholar, NIH-PREP Program (\$21,000) <i>Award to encourage individuals from diverse backgrounds to pursue a research-focused doctoral degree National Institutes of Health (NIH) and Arizona State University (ASU) (2012-2013)</i>	
Moeur Award from the ASU Alumni Association <i>Arizona State University; Awarded for graduating with the highest GPA in a department (2012)</i>	
The College of Liberal Arts and Sciences Dean's Undergraduate Research Scholarship for the Life Sciences (\$2,500) <i>Arizona State University; Awarded to one student in the life sciences to fund an undergraduate research proposal (2011)</i>	
National Hispanic Scholarship from the National Merit Scholarship Program (\$92,000) <i>Arizona State University (2008-2012)</i>	

Research Experience

Associate Research Scholar High Meadows Environmental Institute (HMEI), Princeton University Advisor: C. Jessica E. Metcalf, PhD	2022-present
Presidential Postdoctoral Research Fellow Department of Ecology and Evolutionary Biology, Princeton University Advisor: C. Jessica E. Metcalf, PhD	2019-2022

Doctoral Student Department of Organismic and Evolutionary Biology, Harvard University Co-Advisors: Daniel L. Hartl, PhD; Christopher D. Golden, PhD	2013-2019
NIH Postbaccalaureate Research Education Program (PREP) Fellowship. School of Life Sciences and Center for Evolutionary Medicine and Informatics, Arizona State University Principal Investigator: Ananias A. Escalante, PhD	2012-2013
Intern, Introduction to Neotropical Research and Culture Program Smithsonian Tropical Research Institute, Gamboa, Panama Principal Investigator and Mentor: W. Owen McMillan, PhD	Summer 2012
Field Assistant, Sonoran Desert Tortoise (<i>Gopherus morafka</i>) Monitoring Project Arizona Department of Game and Fish, Threatened Wildlife Project Principal Investigator: Andrew Bridges, Applied Biological Sciences Graduate Program, ASU	Spring 2012
Visiting Student Researcher, Centro Latino Americano de Investigacion en Malaria Latin American Center for Malaria Research and Control, Cauceseco Research Center, Cali, Colombia	Fall 2011

Publications

1. **Rice BL**, Lessler J, McKee C, Metcalf CJE. **Why do some coronaviruses become pandemic threats when others do not?** *PLoS Biology*. 2022 May 16;20(5):e3001652. [[PubMed: 35576224](#)]
2. Rasambainarivo F, Ramiadantsoa T, Rahehinandrasana A, Randrianarisoa S, **Rice BL**, Evans MV, Roche B, Randriatsarafara FA, Wesolowski A, Metcalf CJE. **Prioritizing COVID-19 vaccination efforts and dose allocation within Madagascar.** *BMC Public Health*. 2022 Apr 12;22(1):724. [[PubMed: 35413894](#)]
3. Ramiadantsoa T, Metcalf CJE, Rahehinandrasana A, Randrianarisoa S, **Rice BL**, Wesolowski A, Randrianarisoa S, Randriatsarafara FM, Rasambainarivo F. **Existing human mobility data sources poorly predicted the spatial spread of SARS-CoV-2 in Madagascar.** *Epidemics*. 2022 Mar;38:100534. [[PubMed: 34915300](#)]
4. **Rice BL**, Annapragada A, Baker RE, Bruijning M, Dotse-Gborgborts W, Mensah K, Miller IF, Motaze NV, Rahehinandrasana A, Rajeev M, Rakotonirina J, Ramiadantsoa T, Rasambainarivo F, Yu W, Grenfell BT, Tatem AJ, Metcalf CJE. **Variation in SARS-CoV-2 outbreaks across sub-Saharan Africa.** *Nature Medicine*. 2021 Feb 2. s41591-021-01234-8. [[PubMed: 33531710](#)]
5. Baker RE, Mahmud AS, Miller IF, Rajeev M, Rasambainarivo F, **Rice BL**, Takahashi S, Tatem AJ, Wagner CE, Wang L, Wesolowski A, Metcalf CJE. **Infectious disease in an era of global change.** *Nature Reviews Microbiology*. 2021 Oct 13;20(4):193-205. [[PubMed: 34646006](#)]
6. **Rice BL**, Douek DC, McDermott AB, Grenfell BT, Metcalf CJE. **Why so few (or so many) circulating coronaviruses?** *Trends in Immunology*. 2021 Sep;42(9):751-763. [[PubMed: 34366247](#)]
7. **Rice BL**, Golden CD, Randriamady HJ, Rakotomalala ANAA, Vonona MA, Anjaranirina EJG, Hazen J, Castro MCC, Metcalf CJE, Hartl DL. **Fine-scale variation in malaria prevalence across ecological regions in Madagascar: A cross-sectional study.** *BMC Public Health*. 2021 May 29;21(1):1018 [[PubMed: 34051786](#)]
8. Glennon EE, Bruijning M, Lessler J, Miller IF, **Rice BL**, Thompson RN, Wells K, Metcalf CJE. **Challenges in modeling the emergence of novel pathogens.** *Epidemics*. 2021 Oct 22;37:100516. [[PubMed: 34775298](#)]
9. Raselimanana M, **Rice BL**, Kappeler PM, Eckhardt FS. **Phenology and growth plasticity under climatic variation in a short-lived chameleon.** *Salamandra*. 2021 Aug 15;57(3): 435–443. [[Link](#)]
10. Rasambainarivo F, Rasoanomenjanahary A, Rabarison JH, Ramiadantsoa T, Ratovoson R, Randremanana R, Randrianarisoa S, Rajeev M, Masquelier B, Heraud JM, Metcalf CJE, **Rice BL**.

- Monitoring for outbreak-associated excess mortality in an African city: Detection limits in Antananarivo, Madagascar.** *International Journal of Infectious Diseases*. 2020 Nov 26;103:338-342. [[PubMed: 33249289](#)]
11. Arisco NJ, [Rice BL](#), Tantely LM, Girod R, Emile GN, Randriamady HJ, Castro MC, Golden CD. **Variation in *Anopheles* distribution and predictors of malaria infection risk across regions of Madagascar.** *Malaria Journal*. 2020 Sep 29;19(1):348. [[PubMed: 32993669](#)]
 12. Golden CD, [Rice BL](#), Randriamady HJ, Vonona AM, Randrianasolo JF, Tafangy AN, Andrianantenaina MY, Arisco NJ, Emile GN, Lainandrasana F, Mahonjolaza RFF, Raelson HP, Rakotoarilalao VR, Rakotomalala AANA, Rasamison AD, Mahery R, Tantely ML, Girod R, Annapragada A, Wesolowski A, Winter A, Hartl DL, Hazen J, Metcalf CJE. **Study Protocol: A Cross-Sectional Examination of Socio-Demographic and Ecological Determinants of Nutrition and Disease Across Madagascar.** *Frontiers in Public Health*. 2020 Sep 17;8:500. [[PubMed: 33042943](#)]
 13. Arisco N, [Rice BL](#), Tantely LM, Girod R, Emile GN, Randriamady HJ, Castro MC, Golden CD. **Deforestation and malaria in Madagascar: a new framework to explore linkages in the absence of robust health reporting infrastructure.** *The Lancet Planetary Health*. 2019 September 3, p. 14. [[Link](#)]
 14. Golden CD, Borgerson C, [Rice BL](#), Allen LH, Anjaranirina EJG, Barrett CB, Gephart J, Hampel D, Hartl DL, Knippenberg E, Ralalason D, Ramihantaniarivo H, Randriamady H, Shahab-Ferdows S, Vaitla B, Volkman SK, Vonona MA, Myers SS. **Cohort Description of the Madagascar Health and Environmental Research-Antongil (MAHERY-Antongil) Study in Madagascar.** *Frontiers in Nutrition*. 2019;6: 109. [[PubMed: 31428615](#)]
 15. Pasolli E, ..., [Rice BL](#), Golden CD, et al. **Extensive novel human microbiome diversity revealed by over 150,000 genomes from metagenomes spanning age, geography, and lifestyle.** *Cell*. 2019 Jan 24;176(3):649-662.e20. [[PubMed: 30661755](#)]
 16. Vaitla B, Collar D, Smith MR, Myers SS, [Rice BL](#), Golden CD. **Predicting nutrient content of ray-finned fishes using phylogenetic information.** *Nature Communications*. 2018 Sep 25;9(1):3742. [[PubMed: 30254265](#)]
 17. [Rice BL](#), Golden CD, Randriamady HJ, Arisco NJ, Hartl DL. **Integrating approaches to study land use change and hotspots of malaria transmission in rural Madagascar: an observational study.** *The Lancet Planetary Health*. 2018 May 01, Vol.2, p.S19. [[Link](#)]
 18. Golden CD, Anjaranirina EJG, Fernald LCH, Hartl DL, Kremen C, Milner DA Jr, Ralalason DH, Ramihantaniarivo H, Randriamady H, [Rice BL](#), Vaitla B, Volkman SK, Vonona MA, Myers SS. **Cohort Profile: The Madagascar Health and Environmental Research (MAHERY) study in North-eastern Madagascar.** *International Journal of Epidemiology*. 2017 Dec 1;46(6):1747-1748d. [[PubMed: 29040632](#)]
 19. [Rice BL](#), Golden CD, Anjaranirina EJ, Botelho CM, Volkman SK, Hartl DL. **Genetic evidence that the Makira region in northeastern Madagascar is a hotspot of malaria transmission.** *Malaria Journal*. 2016 Dec 20;15(1):596. [[PubMed: 27998292](#)]
 20. Daniels RF, [Rice BL](#), Daniels NM, Volkman SK, Hartl DL. **The utility of genomic data for *Plasmodium vivax* population surveillance.** *Pathogens and Global Health*. 2015 May;109(3):153-61. [[PubMed: 25892032](#)]
 21. [Rice BL](#), Acosta MM, Pacheco MA, Carlton JM, Barnwell JW, Escalante AA. 2014. **The origin and diversification of the merozoite surface protein 3 (msp3) multi-gene family in *Plasmodium vivax* and related parasites.** *Molecular Phylogenetics and Evolution*. 2014 Sep;78:172-84. [[PubMed: 24862221](#)]
 22. [Rice BL](#), Acosta MM, Pacheco MA, Escalante AA. 2013. **Merozoite surface protein 3 alpha as a genetic marker for epidemiologic studies in *Plasmodium vivax*: a cautionary note.** *Malaria Journal*. 2013 Aug 21;12(1):288. [[PubMed: 23964962](#)]

Research Funding and Grants

(\$50,000) Global Institute for Disease Elimination Falcon Awards for Disease Elimination – The Climate Edit “Accelerating malaria elimination in the face of extreme weather disruptions” Rice BL (PI), Rebaliha M, Metcalf CJE	2023
(\$1,250,000) CRS Madagascar – Malaria Strategic Change Platform “Malaria-malnutrition epidemiology and ecology in Southeast Madagascar” Rice BL (PI), Rebaliha M, Golden CD, Hazen J	2022-2026
(\$140,000) Johns Hopkins Malaria Research Institute Pilot Grant “Parasite genomics of imported and local infections of malaria in Madagascar” Wesolowski A (PI), Rice BL	2023-2024
(\$100,000) Barron Family Biodiversity Research Challenge Fund “Biodiversity Conservation and Health at the Human-Domestic Animal-Wildlife Interface in Madagascar” Metcalf CJE (PI), Rasambainarivo F, Rice BL	2021-2021
(\$320,000) CRS Madagascar – Malaria Strategic Platform “Targeting malaria-malnutrition co-interventions in remote communities in Southeast Madagascar” Rice BL (PI), Golden CD, Hazen J	2020-2022
(\$15,000) Princeton Center for Health and Wellbeing Seed Grant “Optimizing COVID-19 vaccination distribution in low-income settings: Madagascar as a case study” Rasambainarivo F (PI), Rice BL, Metcalf CJE	2021-2022
(\$15,000) Princeton Center for Health and Wellbeing Seed Grant “The need to strengthen surveillance in resource poor settings” Rice BL (PI), Rasambainarivo F, Metcalf CJE	2020-2021
(\$9,000) Presidential Postdoctoral Research Fellowship Fund Dean of the Faculty, Princeton University “The ecological and evolutionary dynamics of human and wildlife parasites in Madagascar” Rice BL	2019-2022
(\$65,000) Wellcome Trust Our Planet, Our Health Program (grant 106866/Z/15/Z) “The relationship between environmental change and human nutrition and health in Madagascar” Metcalf CJE (PI), Rice BL, Golden CD	2016-2017
(\$100,000) United States Agency for International Development (from grant AID-FFP-A-14-00008) “Socio-demographic and ecological determinants of nutrition and disease across Madagascar” Hazen J (PI), Rice BL, Golden CD	2016-2017

Teaching and Mentorship Experience

Co-mentor, Princeton Environmental Institute Summer Internship in Madagascar “Health and Conservation at the Human-Domestic Animal-Wildlife Interface in Madagascar” Princeton University; Mahaliana Laboratory, Madagascar	2022-2024
Mentor, EEB Scholars Program Program to support students from underrepresented groups applying to EEB PhD programs Department of Ecology and Evolutionary Biology, Princeton University	2023-2024
Workshop Leader, CVs and Motivational Letters for Graduate Applications University of Antananarivo Masters Students, Madagascar Biodiversity Center, Antananarivo, Madagascar	Dec 2022, May 2023, Dec 2023
Instructor, Disease Ecology: Advanced Module Universidade Estadual Paulista, South American Institute for Fundamental Research, Sao Paulo, Brazil	Oct 2022

Mentor, Princeton Global Health Program Summer Internship in Madagascar “Princeton Madagascar One Health Research Initiative” Princeton University	Summer 2022
Teaching Faculty, Global Health Program 351: Epidemiology: An Ecological and Evolutionary Perspective Princeton University; Undergraduate Course	Spring 2022
Founder, Ecology Journal Club in Madagascar Princeton University; Mahaliana Laboratory, Madagascar	2019-2020
Co-Founder, Malagasy STEM Master’s Student Scholarship Princeton University, University of Antananarivo, Madagascar	2020-2021
Instructor, Mol’Ecol: Molecular Ecology and R in Madagascar Princeton Environmental Institute; Mahaliana Laboratory, Madagascar	Summer 2019
Teaching Fellow, Organismic and Evolutionary Biology 242: Population Genetics Certificate of Distinction in Teaching, Office of Undergraduate Education Harvard University	Spring 2019
Instructor, E ² M ² : Ecological and Epidemiological Modeling in Madagascar Institut Pasteur Madagascar and Princeton University	Jan 2019
Teaching Fellow, Organismic and Evolutionary Biology 50: Genetics and Genomics Certificate of Distinction in Teaching, Office of Undergraduate Education Harvard University	Fall 2015, Fall 2018
Mentor, Planetary Health Undergraduate Research Fellowship Program in Madagascar Harvard University and MAHERY Madagascar	2017-2018
Teaching Fellow, Environmental Science and Public Policy 90D: Planetary Health Harvard University	Spring 2018
Mentor, Student Success Jobs Program, Boston, MA Brigham Women’s Hospital joint program for underrepresented high school students in the sciences	2015-2016

Research Presentations

- 13th International Mammalogical Conference | Anchorage, Alaska [Co-author on oral presentation presented by Fidisoa Rasambainarivo]
 - “Introduced Pathogens and Conservation: Disentangling transmission between carnivores in Madagascar”
- American Society of Tropical Medicine and Hygiene, Seattle WA (November 2022) [Posters]
 - “Stratifying Malaria Control Approaches in Madagascar: Monitoring Spatio-temporal Variation and the Impact of Extreme Weather Events in the Coastal Mananjary District”
 - “Malaria Burden and Malnutrition within Mananjary District, Southeastern Madagascar: The Potential Impact of Improved Multisectoral Programming”
 - “Larval performance, breeding habitat preference, and interspecific competition between *Aedes albopictus* and *Aedes aegypti* in Madagascar”
- Johns Hopkins Malaria Research Institute | Futures of Malaria Research Symposium (October 2022) [Poster] “Spatial and temporal variation within a malaria hotspot in southeast Madagascar”
- Rice University | Institute for Global Health Technologies (October 2022) [Invited Seminar] “The ecology of infectious diseases in a changing world: Coronaviruses, Malaria, and Madagascar”
- Madagascar Biodiversity Center, Antananarivo, Madagascar (May 2022) [Invited Seminar] “Ecology and Evolution of Malaria Parasites (Mostly in Madagascar)”
- Johns Hopkins Malaria Research Institute | World Malaria Day (April 2022) [Lightning Talk: Virtual] “Spatio-temporal Variation within a High Malaria Prevalence District: The Mananjary Cohort Study in Southeastern Madagascar”
- International Humboldt Day | Madagascar Seminar (September 2020) [Oral Presentation: Virtual] “Parasites in Madagascar: Hosts as Islands on Islands”

8. American Embassy MEET US Talk Series | Antananarivo, Madagascar (December 2019) [Invited Seminar] “New Approaches to Understanding Health in Rural Communities in Madagascar”
9. Association for Tropical Biology and Conservation, Antananarivo, Madagascar (August 2019) [Oral Presentation] “Small-scale spatial variation in malaria prevalence and deforestation among human communities near priority areas in Madagascar”
10. Johns Hopkins Malaria Research Institute | Futures of Malaria Research Symposium (October 2018) [Oral Presentation] “Exploring spatial patterns in malaria prevalence across eco-regions of Madagascar”
11. Planetary Health Alliance 2nd Annual Meeting | University of Edinburgh (May 2018) [Oral Presentation] “From genes to geography: Integrating approaches to study land use change and hotspots of malaria transmission in rural Madagascar”
12. Institut Pasteur Madagascar | Infectious Disease Unit, Antananarivo, Madagascar (July 2016) [Oral Presentation] “Notes on the ecology and evolutionary biology of *Plasmodium falciparum* in the Maroantsetra region of Madagascar”
13. American Society of Tropical Medicine and Hygiene, Washington DC (November 2013) [Poster] “Recombination and resolution: A note about *Plasmodium vivax* merozoite surface protein 3 alpha as a molecular marker”
14. American Society of Tropical Medicine and Hygiene, Atlanta GA (November 2012) [Posters]
 - “A more ancient origin for high copy number of the merozoite surface protein 3 (MSP3) family”
 - “Limitations of single gene mitochondrial approaches for identifying species of malarial parasites”
15. 19th Annual Undergraduate Research Symposium, School of Life Sciences, Arizona State University (March 2012) [Poster] “Evolution of the merozoite surface protein 3 gene family in the malaria parasite *Plasmodium vivax* and related species”
16. American Society of Tropical Medicine and Hygiene, Philadelphia PA (December 2011) [Poster] “Similar diversity of the merozoite surface protein 3 alpha (MSP3 α) subfamily in Thai and Venezuelan *Plasmodium vivax* populations”
17. 18th Annual Undergraduate Research Symposium, School of Life Sciences, Arizona State University (March 2011) [Poster] “The genetic diversity of merozoite surface protein 3-alpha in *Plasmodium vivax*”

Academic Service: Peer Review

Reviewer for the following journals:

Nature, *PNAS*, *Current Biology*, *Infection Genetics Evolution*, *Malaria Journal*, *PLOS One*, *The Lancet Global Health*, *Journal of Animal Ecology*, *International Journal of Epidemiology*, *BMC Public Health*

Press Coverage of Research Work

Institut Pasteur de Madagascar (16 May 2021)

Hétérogénéité spatiale des facteurs de risque de contracter le paludisme à Madagascar

<http://www.pasteur.mg/heterogeneite-spatiale-des-facteurs-de-risque-de-contracter-le-paludisme-a-madagascar/>

Nature Africa (17 March 2021)

Capturing the complexity of COVID-19 in sub-Saharan Africa

<https://www.nature.com/articles/d44148-021-00009-0>

High Meadows Environmental Institute - Princeton University Homepage (17 February 2021)

True toll of coronavirus on sub-Saharan Africa may be obscured by tremendous variability in risk factors and surveillance.

<https://www.princeton.edu/news/2021/02/17/true-toll-coronavirus-sub-saharan-africa-may-be-obscured-tremendous-variability>

Extracurricular and Volunteer Work

Co-founder, MALAGASY STEM: Masters student program for promoting

2019-present

the sciences in Madagascar

Volunteer, Election Protection Arizona

Coconino County and Tuba City, Navajo Nation, Arizona

October-November 2020

Board Member, MAHERY (Madagascar Health and Environmental Research) NGO

2016-present

Participant in Study Abroad Program on Health and Human Ecology in New Zealand

2009

School of Human Evolution and Social Change, Arizona State University

Proficient in Spanish (7 years)

Proficient in Malagasy (7 years)