Gideon Bradburd

December 27, 2024

3042 Biological Sciences Building
Department of Ecology & Evolutionary Biology
University of Michigan

email: bradburd@umich.edu
website: genescape.org
software: github.com/gbradburd

EDUCATION & APPOINTMENTS

Asst. Professor	*University of Michigan* Department of Ecology and Evolutionary Biology	2022 - present
Asst. Professor	*Michigan State University* Department of Integrative Biology Ecology, Evolution, and Behavior Program fixed-term (2016-17); tenure-stream (2017-2022)	2016 - 2022
Postdoc	*University of California, Berkeley* Museum of Vertebrate Zoology Department of Env. Sci. Pol. and Mgmt Advisors: Michael Nachman, Bree Rosenblum	2015 - 2016
PhD	*University of California, Davis* Population Biology Graduate Group Department of Ecology and Evolutionary Biology Advisors: Graham Coop, Brad Shaffer	2009 - 2015
Bachelor of Science	*Yale University* Ecology and Evolutionary Biology Honors Thesis Advisor: Tom Near	2004 - 2008

LEAVES & MODIFIED DUTIES

2020	Second child born in Aug, 6 weeks parental leave, teaching release Spring Semester 2021
2016	First child born in November, 3 weeks parental leave, one-year tenure clock extension

PUBLICATIONS

*advisees (e.g., students/postdocs)

Preprints, In Review, and In Revision

*Hancock, ZB, NE Adams, PL Wood, GS Bradburd. **2024**. Asymmetric gene flow maintains an abundant range center. bioRxiv

*Grundler, MC, J Terhorst, GS Bradburd. **2024**. A geographic history of human genetic ancestry. biorXiv. (in second round of review, **Science**).

Buysse, SF, SG Pérez, JR Puzey, A Garrison, GS Bradburd, CG Oakley, X Picó, SJ Tonsor, EB Josephs, JK Conner. **2024**. The roles of drift and selection on short stamen loss in *Arabidopsis thaliana* along an elevational gradient in the Spanish Pyrenees. biorXiv. (in revision, **Evolution**)

Published and Accepted

29. *Clark, MI, SW Fitzpatrick, GS Bradburd. **2024**. Pitfalls and windfalls of detecting demographic declines using population genetics in long-lived species. **Evolutionary Applications**. 17 (7), e13754.

28. Cocciardi JM, AM Hoffman, A Waananen, DL Des Marais, D Moeller, D Gamba, D Alvarado-Serrano, E Boehm, E Kottler, G Bradburd, H Branch, I Borokini, J Cavender-Bares, J Lau, J Anderson, J Jaros, K Toll, K Whitney, L Bolin, L Brudvig, M Ungerer, M Vahsen, M Blumstein, M Smith, M Howard, M Menon, NP Hanan, N Kooyers, R Shaw, S Sheth, S Wadgymar, T Mozdzer, T Juenger, T Chen, ML Avolio. **2024**. The value of long-term ecological research for evolutionary insights. **Nature Ecology & Evolution**. 8, 1584–1592.

27. *Hancock, Z, *RH Toczydlowski, GS Bradburd. **2024**. A spatial approach to jointly estimate Wright's neighborhood size and long-term effective population size. **Genetics**. 227 (4).

26. *Lewanski, AL, *MC Grundler, GS Bradburd. **2024**. The era of the ARG: An introduction to ancestral recombination graphs and their significance in empirical evolutionary genomics. **PLoS Genetics**. 20(1): e1011110.

25. *Week, B and GS Bradburd. **2024**. Host-parasite coevolution in continuous space leads to variation in local adaptation across spatial scales. **American Naturalist** 203:1, 43-54.

24. Mathur, S, A Mason, GS Bradburd, HL Gibbs. **2023**. Functional genomic diversity is correlated with neutral genomic diversity in populations of an endangered rattlesnake. **Proceedings of the National Academy of Sciences** 120 (43).

23. Crandall, ED, *RH Toczydlowski, L Liggins, AE Holmes, M Ghoojaei, MR Gaither, BE Wham, AL Pritt, C Noble, TJ Anderson, RL Barton, JT Berg, SG Beskid, A Delgado, E Farrell, N Himmelsbach, SR Queeno, T Trinh, C A Weyand, A Bentley, J Deck, C Riginos, GS Bradburd, RJ Toonen. **2023**. The importance of timely metadata curation to the global surveillance of genetic diversity. **Conservation Biology** 37, e14061.

22. Martin, BS, GS Bradburd, LJ Harmon, MG Weber. **2022**. Modeling the evolution of rates of continuous trait evolution. **Systematic Biology** 72 (3), 590-605.

21. *Clark, M, GS Bradburd, M Akopyan, A Vega, E Rosenblum, J Robertson. **2022**. Genetic isolation by distance underlies color pattern divergence in red-eyed treefrogs (*Agalychnis callidryas*). **Molecular Ecology**. 31: 1666-1681.

20. *Toczydlowski, RH, L Liggins, MR Gaither, TJ Anderson, RL Barton, JT Berg, SG Beskid, B Davis, A Delgado, E Farrell, M Ghoojaei, N Himmelsbach, AE Holmes, SR Queeno, T Trinh, CA Weyand, GS Bradburd, C Riginos, RJ Toonen, ED Crandall. **2021**. Poor data stewardship will hinder global genetic diversity surveillance. **Proceedings of the National Academy of Sciences** 118 (34).

19. *Puckett, E, S Murphy, GS Bradburd. **2021**. Phylogeographic analysis delimits three evolutionary significant units of least chipmunks in North America and identifies unique genetic diversity within the imperiled Peñasco population. **Ecology and Evolution** 11: 12114-12128.

18. Schweizer, RS, MR Jones, GS Bradburd, JF Storz, N Senner, C Wolf, ZA Cheviron. **2021**. Broad concordance in the spatial distribution of adaptive and neutral genetic variation along an elevational cline in deer mice. **Molecular Biology and Evolution** 38 (10), 4286-4300.

17. *Hancock, ZB, ES Lehmberg, GS Bradburd. **2021**. Neo-darwinism still haunts evolutionary theory: A modern perspective on Charlesworth, Lande, and Slatkin (1982). **Evolution** 75: 1244-1255.

16. Rothstein, A, R Knapp, GS Bradburd, D Boiano, EB Rosenblum. **2020**. Stepping into the past to conserve the future: archived skin swabs from extant and extinct populations inform genetic management of an endangered amphibian. **Molecular Ecology** 29 (14): 2598-2611.

15. Fitzpatrick, SW GS Bradburd, CT Kremer, PE Salerno, LM Angeloni, WC Funk. **2020**. Genomic and fitness consequences of genetic rescue in wild populations. **Current Biology** 30: 1-6.

14. Schweizer, RM, JP Velotta, CM Ivy, MR Jones, SM Muir, GS Bradburd, JF Storz, GR Scott, ZA Cheviron. **2019**. Physiological and genomic evidence that a transcription factor contributes to adaptive cardiovascular function in high-altitude deer mice. **PLoS Genetics** 15 (11), e1008420.

13. Bradburd, GS and PL Ralph. **2019**. Spatial population genetics: It's about time. **Annual Reviews in Ecology, Evolution, and Systematics** 50: 427-449.

12. Grieneisen, LE, MJE Charpentier, SC Alberts, R Blekhman, GS Bradburd, J Tung, EA Archie. **2019**. Genes, geology, and germs: gut microbiota across a primate hybrid zone are explained by site soil properties, not host species. **Proceedings of the Royal Society B** 286: 20190431.

11. Bradburd, GS, GM Coop, and PL Ralph. **2018**. Inferring continuous and discrete population genetic structure across space. **Genetics** 210: 33-52.

10. Weber, JN, GS Bradburd, YE Stuart, WE Stutz, DI Bolnick. **2017**. Partitioning the effects of isolation by distance, environment, and physical barriers on genomic divergence between parapatric threespine stickleback. **Evolution** 71: 342-56.

9. Hoban, S, JL Kelley, KE Lotterhos, MF Antolin, GS Bradburd, DB Lowry, ML Poss, LK Reed, A Storfer, MC Whitlock. **2016**. Finding the genomic basis of local adaptation in non-model organisms: pitfalls, practical solutions, and future directions. **American Naturalist** 188: 379-397.

8. Bradburd, GS, PL Ralph, GM Coop. **2016**. A spatial framework for understanding population structure and admixture. **PLoS Genetics** 12: e1005703.

7. Hammock, BG, S Lesmeister, I Flores, GS Bradburd, FH Hammock, SJ Teh. **2016**. Low food availability narrows the tolerance of the copepod *Eurytemora affinis* to salinity, but not to temperature. **Estuaries and Coasts**. 39: 189-200.

6. Agrawal, AA, AP Hastings, GS Bradburd, EC Woods, T Züst, J Harvey, T Bukovinszky. **2015**. Evolution of plant growth and defense in a continental introduction. **American Naturalist** 186: 1-15.

5. Wang, IJ†and GS Bradburd†. **2014**. Isolation by environment. **Molecular Ecology** 23: 5649-5662. (†co-first authors)

4. Bradburd, GS, PL Ralph, and GM Coop. **2013**. Disentangling the effects of geographic and ecological isolation on genetic differentiation. **Evolution** 67: 3258-3273.

3. Rejmanek, D, P Freycon, GS Bradburd, J Dinstell, and J Foley. **2013**. Unique strains of *Anaplasma phagocytophilum* segregate among diverse questing and non-questing *Ixodes* tick species in the western United States. **Ticks and Tick-borne Diseases** 4: 482-487.

2. Rejmanek, D, GS Bradburd, and J Foley. **2012**. Molecular characterization reveals distinct genospecies of *Anaplasma phagocytophilum* from diverse North American hosts. **Journal of Medical Microbiology** 61: 204-212.

1. Near, TJ, CM Bossu, GS Bradburd, RL Carlson, RC Harrington, PR Hollingsworth Jr., BP Keck, DA Etnier. **2011**. Phylogeny and temporal diversification of darters (*Percidae: Etheostomatinae*). **Systematic Biology** 60: 565-595.

Other

Shaffer, HB, E McCartney-Melstad, PL Ralph, GS Bradburd, E Lundgren, J Vu, B Hagerty, F Sandmeier, C Weitzman, CR Tracy. **2017**. Desert Tortoises in the genomic age: population genetics and the landscape. bioRxiv (Public comment on Desert Renewable Energy Conservation Plan).

FUNDING

External

NSF Division of Environmental Biology Award# 2223962 (2022-2026) **$1,536,017**
The interaction of selection, pleiotropy, and drift in phenotypic evolution
(PI: J Conner; co-PIs: G Bradburd, R Last, T Juenger)
Bradburd lab budget: $210,974.4

NIH NIGMS Early Stage Investigator MIRA (R35) Award# R35GM137919 (2020-2025) **$1,849,678**
Incorporating geography into statistical methods for analysis of population genomic DNA
(PI: G Bradburd)

NSF Bridging Ecology & Evolution Award# 2016569 (2020-2024) **$920,700**
Testing eco-evolutionary effects of genetic drift and gene flow in stressful environments
(PI: S Fitzpatrick; co-PIs: B Rothermel, G Bradburd)
Bradburd lab budget:$157,590

NSF Dimensions of Biodiversity (2017-2022) **$1,118,520**
Diversification of sensory systems in novel habitat
(PI: J Boughman; co-PIs: G Bradburd, H Hofmann, J Keagy, D Stenkamp)
Bradburd lab budget: $158,851

NSF Doctoral Dissertation Improvement Grant (DDIG) (2014-15) **$13,918**
The effect of intraspecific host variation on the structure of parasite populations
(PI: G Bradburd; co-PI: G Coop)

Internal

MSU Strategic Partnership Grant (2021-2022) **$400,000**
The Institute for Biodiversity, Ecology, Evolution, and Macrosystems (IBEEM)
(PI: PL Zarnetske. co-PIs: KS Cheruvelil, E Zipkin, KM Dahlin, G Bradburd, J Robinson)

Beacon - NSF Center for the Study of Evolution in Action (2016-2021) **$127,579**
Evolution of sensory systems in response to loss of visual information
(PI: J Boughman, co-PIs: G Bradburd, H Hofmann, J Keagy, D Stenkamp)

SOFTWARE

Grundler, M, J Terhorst, GS Bradburd (2024). **GAIA**. A method for inferring the geographic locations of shared genetic ancestors in a tree sequence. R package version v1.0. https://github.com/blueraleigh/gaia

Bradburd, GS (2018). **conStruct**. A genetic clustering method that accounts for isolation by distance. R package version v1.0.6. https://cran.r-project.org/web/packages/conStruct/index.html

Bradburd, GS (2016). **SpaceMix**. A program for estimating geogenetic maps from allele frequency data. R package version 0.13. https://github.com/gbradburd/SpaceMix

Bradburd, GS (2013). **BEDASSLE**. Bayesian Estimation of Differentiation in Alleles by Spatial Structure and Local Ecology. R package version 1.6.1. https://cran.r-project.org/web/packages/BEDASSLE

MENTORSHIP & ADVISING

Postdocs

Seth Temple (Schmidt AI in Science Fellow)	2024-present
Mike Grundler	2022-present
Zach Hancock	2021-present
Leonard Jones (NSF Postdoctoral Research Fellowship in Biology)	2021-2024
current position: Bondermann Fellow, University of Washington	
Phil Gerrish	2022-2024
current position: Researcher, Los Alamos National Lab	
Bob Week	2020-2022
current position: Postdoctoral Researcher, University of Oregon	
Rachel Toczydlowski	2019-2022
current position: Research Landscape Geneticist, US Forest Service	
Matteo Tomasini	2019-2021
current position: Research Software Engineer, University of Gothenburg	
Kelsey Yule	2018-2019
current position: Project Manager of the NEON Biorepository, Arizona State University	
Emily Puckett	2017 - 2018
current position: Asst. Professor of Biological Sciences, U. Tennessee, Memphis	

PhD Students

Meaghan Clark	2019-2024
current position: NSF Postdoctoral Research Fellow, UC Santa Cruz	
Alex Lewanski (DoD National Defense Science and Engineering Graduate Fellowship)	2022-present

Bioinformaticians/Technicians

Nicole Adams	2022-present
Chris Talbot	2024-present

Graduate student committee service

Current graduate student committees

Ivana Barnes	Masters, EEB, University of Michigan
Nepsis García	PhD, EEB, University of Michigan
Gayathri Venkatraman	PhD, EEB, University of Michigan
Kiran Kumar	PhD, Biostatistics, University of Michigan
Tristan Schramer	PhD, EEB, University of Michigan
Teresa Sauer	PhD, EEB, University of Michigan
Yu Kai Tan	PhD, EEB, University of Michigan
Sofia Maria Backlund	PhD, Institute of Science and Technology (Vienna)
Jimmy Bingman	PhD, Plant Biology, MSU
Matheus Januario Lopes de Sousa	PhD, EEB, University of Michigan

Past graduate student committees

Bruce Martin	PhD 2024, Plant Biology, MSU
Enes Dilber	PhD 2023, Statistics, University of Michigan
Miranda Wade	PhD 2023, Integrative Biology, MSU
Sara Hugentobler	PhD 2023, Integrative Biology, MSU
Kyle Teller	PhD 2022, Integrated Applied Math, University of New Hampshire
Viviana Ortiz Londono	PhD 2022, Plant Pathology, MSU
Ava Garrison	PhD 2022, Plant Biology, MSU

Michael Foisy	MSc 2020 , Plant Biology, MSU
Dr. Emily Dolson	PhD 2019, Computer Science and Engineering, MSU

Undergraduates

Ben Carlson	2024 - present
Guoxiang (Jerry) Guo	2024 - present
Lindsay Guare (MSU)	2017 - 2019
Sarah Frocillo (MSU)	2017 - 2018
Nick Stants (MSU)	2017 - 2018

HONORS, AWARDS, & FELLOWSHIPS

Fitch Award Finalist, Society for Molecular Biology and Evolution ($2000)	2015
Hamilton Award Finalist, Society for the Study of Evolution ($500)	2015
XSEDE SuperComputing Resource Allocation, XSEDE (50,000 SUs)	2014-05
Center for Population Biology Research Fellowship CPB, UC Davis ($4,000)	2011-13
NSF Graduate Research Fellow National Science Foundation ($90,000)	2010-12
Graduate Scholars Fellowship in Population Biology, UC Davis ($30,000)	2009-10

TEACHING

University of Michigan

Introduction to Statistical Model Building in R (EEB 429)	Instructor	WN23,24
Undergraduate course (20-40 students/yr); introduction to coding and statistics in R.		
Evolution (EEB 390)	Instructor	WN23,FA24
Undergraduate course (100-150 students/yr); introduction to evolutionary biology.		

Michigan State University

Evolutionary Biology (IBio 849)	Instructor	SP18,19,20,22
Graduate-level course (20-40 students/yr); introduction to evolutionary biology.		
Intro to Statistical Methods in Ecology/Evolution (IBio 830)	Instructor	FA17,18,19,20
Graduate-level course (40-60 students/yr); introduction to coding and statistics in R.		
Evolution Discussion Group (IBio 895)	Instructor	SP17,18,19,20
Graduate student-led discussion group on a rotating technical topic in evolutionary biology.		

SERVICE & LEADERSHIP

National/International/Society Service

Organizer SMBE Symposium: "Spatial population genetics: where are we now?"	2024
Organizing Committee Midwest Population Genetics Conference	2016-present
Conference Ally Society for Molecular Biology and Evolution	2024
Steering Committee NSF EVO-LTER Award: Leveraging long-term ecological research in grasslands: facilitating collaborations between ecologists and evolutionary biologists	2021-present
Course Instructor UCLA/La Kretz Center Workshop in Conservation Genomics	2014, 16, 19
Judge Hamilton Award (Society for the Study of Evolution)	2017, 19

Reviewer including: PNAS; Ecology Letters; Evolution Letters; Genetics; Evolution; American Naturalist; Systematic Biology; Molecular Biology and Evolution; Molecular Ecology; Proceedings of the Royal Society B; American Journal of Human Genetics; Molecular Ecology Resources; Methods in Ecology and Evolution; Molecular Phylogenetics and Evolution; New Phytologist; Bioinformatics; Ecology

Institutional Service

University of Michigan

Director, Frontiers Master's Program	2025-present
Nominating Committee (College of LSA)	2024
Executive Committee (EEB Dept.)	2023-2025
Executive Committee, UM Genome Science Training Program	2023-present
Collegiate Fellows Faculty Search Committee (EEB Dept.)	2023
Founder, Exploring Careers Beyond Academia with Lunch (EEB Dept.)	2023-present
Ad hoc Faculty Search Committee (EEB Dept.)	2023,2024
Seminar Committee (EEB Dept.)	2022-2023

Michigan State University

Diversity, Equity, and Inclusion Committee (Dept. Integrative Biology)	2019-2022
Co-founder, Diversity, Equity, and Inclusion Reading Group (Dept. Integrative Biology)	2019-2022
Co-chair, Presidential Postdoc Fellowship Committee (EEB Program)	2020-2022
Seminar Committee (Dept. Integrative Biology)	2020-2022
Chair Search Committee (Dept. Integrative Biology)	2020-2022
Seminar Committee (EEB Program)	2019-2020
Director Search Committee (EEB Program)	2019-2020
Ad hoc Space Committee (EEB Program)	2019-2020
Strategic Hiring Planning Committee (Dept. Integrative Biology)	2018-2019

INVITED SEMINARS

University of Michigan	University of Michigan Biological Station	2024
European Society for Evolutionary Biology	Integration of Speciation Research	2024
Louisiana State University	Dept. of Biological Sciences	2022
University of Michigan	Dept. of Ecology and Evolutionary Biology	2022
Institute of Science and Technology Austria	EvoLunch	2021
North Dakota State University	Dept. of Biological Sciences	2021
University of St. Andrews	Centre of Ecol. and Env. Modelling	2021
Cornell University	Dept. of Computational Biology	2020
Western Michigan University	Dept. of Biological Sciences	2020
Ohio State University	Dept. of Evolution, Ecology, Organismal Bio.	2019
University of Kentucky	Dept. of Biology	2019
Ecological Society of America	Landscape Genetics (student-organized)	2018
Indiana University	Dept. of Biology/Precision Health Initiative	2018
Penn State University	Ecology Seminar Series	2018
University of Toronto (St. George)	Dept. of Ecology and Evolutionary Biology	2018
University of Toronto (Mississauga)	Dept. of Biology	2017
University of Chicago	Dept. of Ecology and Evolution	2017
Michigan State University	Kellogg Biological Station	2017
University of Michigan	Center for Statistical Genetics	2016
University of Wyoming	Dept. of Botany	2016
University of Colorado Boulder	Dept. Ecology and Evolutionary Biology	2016

University of San Francisco	Dept. of Biology	2016
University of California Berkeley	Museum of Vertebrate Zoology	2015
Michigan State University	Ecology, Evolution, and Behavior	2015
Stanford University	Dept. Genetics and Biology	2015
University of Southern California	Molecular and Computational Biology	2014
University of Montana	Division of Biological Sciences	2014
University of Minnesota	Dept. of Plant Biology	2014
Sonoma State University	Biology Dept.	2014
University of Texas, Austin	Dept. Integrative Biology	2013

CONTRIBUTED PRESENTATIONS

Society for the Study of Evolution	2012-13,15,17,19,23
Population, Evolutionary, Quantitative Genetics Meeting	2018, 2022
Midwestern Population Genetics Meeting	2016
American Society of Naturalists	2016,18
Society for Molecular Biology and Evolution	2015
Bay Area Population Genomics (BAPG)	2014