Michael James Landis
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Last updated: Sep 01, 2024

Education

2015	PhD Integrative Biology *Designated Emphasis in Computational & Genomic Biology* University of California, Berkeley, CA
2005	BS Computer Science California State University, Long Beach, CA

Employment

2019—	Assistant Professor Department of Biology Department of Computer Science & Engineering (*courtesy appointment*) Washington University, St. Louis, MO

Research Experience

2016—2019	Postdoctoral fellow, Yale University, New Haven, CT
2016	Postdoctoral researcher, Iowa State University, Ames, IA
2010—2015	Graduate researcher, University of California, Berkeley, CA
2009—2010	Bioinformatician, Children's Hospital of Oakland, Oakland, CA

Research Interests

I research relationships between evolutionary processes and patterns through a combination of biological, computational, and statistical approaches. My biological interests include phylogenetics, historical biogeography, the evolution of ecological interactions, phenotypic evolution, and epidemiology. My methodological interests include stochastic processes, statistical model design, Bayesian inference, deep learning, and programming. My work typically involves designing new probabilistic models and inference methods to test evolutionary hypotheses in biological and simulated datasets.

Fellowships & Awards

2019	Yale Donnelley Postdoctoral Environmental Fellowship (*resumed*)
2017—2018	NSF Postdoctoral Research Fellowship
2016	Yale Donnelley Postdoctoral Environmental Fellowship
2016	Ernst Mayr Award (*Early Career Award from Society of Systematic Biologists*)
2015	UC Berkeley Integrative Biology Summer Research Award
2012, 2015	UC Berkeley Computational Biology Travel Award
2013	National Evolutionary Synthesis Center Graduate Student Fellowship
2012	Google Summer of Code Student Fellowship

External grants

2023—2028	NSF/NIH-EEID: "Phylogenetic modeling of viral transmission dynamics at the human wildlife interface in Uganda" Awarded $2.54M to PIs Milich (Lead), Landis, Wang ($901k to Landis)
2023—2028	NSF-DBI: "POSE: Phase I: Evolving RevBayes into an Open Source Ecosystem for Phylogenetics." Requested $300k to PIs Heath (Lead), Redelings, Brown, Landis ($32k to Landis)

2021—2024 NSF-DEB 2040347: "Modeling the Origin and Evolution of Hawaiian Plants"
Awarded $1.12M to PIs Landis (Lead), Zapata, Wagner, Rønsted ($547k to Landis)

Internal grants

2024—2025 Here & Next Tier 3: "University-Wide Interdisciplinary Research Initiative on Vector-Borne Disease Systems" Awarded $208k to PIs Adalsteinsson (Lead), Landis, Boon ($40k to Landis)

2022—2024 WUSTL ITF: "The Human-Wildlife Interface: Disease Dynamics and Pandemic Prevention" Awarded $116k to PIs Milich (co-Lead), Landis (co-Lead), Wang ($25k to Landis)

#: grad student; ‡: postdoc; *: shared first; §: shared senior; group member (**bold**)

Manuscripts – Under Review

2024

1. **#McHugh SW**, Donoghue MJ, **Landis MJ**. 2024. A phylogenetic model of established and enabled biome shifts. bioRxiv 2024.08.30.610561.
2. **Landis MJ**, **‡Thompson A**. 2024. phyddle: software for phylogenetic model exploration with deep learning. bioRxiv 2024.08.06.606717.

Manuscripts – Accepted

2024

3. **#Swiston SK**, **Landis MJ**. 2023. Testing relationships between multiple regional features and biogeographic processes of speciation, extinction, and dispersal. bioRxiv 2023.06.19.545613. *Accepted at Systematic Biology.*

Manuscripts – Published

2024

1. **‡Mendes FHK**, **Landis MJ**. 2023. PhyloJunction: a computational framework for simulating, developing, and teaching evolutionary models. Systematic Biology syae048.
2. **‡Soewongsono AC**, **Landis MJ**. 2024. A diffusion-based approach for simulating forward-in-time state-dependent speciation and extinction dynamics. arXiv 2402.00246. Bulletin of Mathematical Biology 86:101.
3. **‡Thompson A**, Liebeskind B, Scully EJ, **Landis MJ**. 2024. Deep learning approaches to viral phylogeography are fast and as robust as likelihood methods to model misspecification. Systematic Biology. 73:183–206.

2023

4. Kawahara AY, Storer C, Carvalho APS, Plotkin DM, Condamine F, **‡Braga MP**, ..., **Landis MJ**, ..., Lohman DJ (88 authors). 2023. Evolution and diversification dynamics of butterflies. Nature Ecology & Evolution doi:10.1038/s41559-023-02041-9.
5. Quintero IM, **Landis MJ**, Jetz W, Mórlòn H. 2023. The build-up of the present-day tropical diversity of tetrapods. Proceedings of the National Academy of Sciences 120:e2220672120.
6. Nielsen SV, Vaughn A, Leppälä, **Landis MJ,** Mailund T, Nielsen R. 2023. Bayesian inference of admixture graphs on Native American and Arctic populations. PLoS Genetics 19:e1010410.

2022

7. Dismukes W, **‡Braga MP**, Hembry DH, Heath TA, **Landis MJ**. Cophylogenetic methods to untangle the evolutionary history of ecological interactions. Annual Reviews of Ecology, Evolution, and Systematics 53:275–298.
8. Donoghue MJ, Eaton DAR, Maya-Lastra CA, **Landis MJ**, Sweeney PJ, Olson, ME, Cacho NI, Moeglin MK, Gardner JR, Heaphy NM, Castorena M, Segovia Rivas A, Clement WL, Edwards EJ. 2022. Replication radiation of a plant clade along a cloud forest archipelago. Nature Ecology & Evolution doi:10.1038/s41559-022-01823-x.
9. Barido-Sottani J, Justison JA, Borges R, Brown JM, Dismukes W, do Rosario Petrucci B, Fabreti Guimarães L, Höhna S, **Landis MJ**, Lewis PO, May MR, Mendes FK, Pett W, Redelings BD, Tribble CM, Wright AM, Zenil-Ferguson R, Heath TA. 2022. Lessons learned from organizing and teaching virtual phylogenetics workshops. Bulletin of the Society of Systematic Biologists doi:10.18061/bssb.v1i2.

10. Wendt EW, Malabarba LR, **‡Braga MP**, Boeger WA, **Landis MJ**, Carvalho TP. Phylogeny, species delimitation, and ecological and morphological diversity of Characithecium (Monogenoidea: Dactylogyridae). 2022. Parasitology 149: 700–716.
11. **Landis MJ**, Quintero I, Muñoz MM, Zapata F, Donoghue MJ. Phylogenetic inference of where species spread or split across barriers. 2022. Proceedings of the National Academy of Sciences 119: e2116948119.
12. Tribble CM, Freyman WA, Lim JY, **Landis MJ**, Barido-Sottani J, Kopperud BT, Höhna S, May MR. 2022. RevGadgets: an R Package for visualizing Bayesian phylogenetic analyses from RevBayes. Methods in Ecology and Evolution 13: 314–323.

2021

13. Höhna S, **Landis MJ**, and Huelsenbeck JP. 2021. Parallel power posterior analyses for fast computation of Bayes factors in phylogenetics. PeerJ: 9:e12438.
14. **‡Braga MP**, Janz N, Nylin S, Ronquist F, and **Landis MJ**. 2021. Phylogenetic reconstruction of ancestral ecological networks through time for pierid butterflies and their host plants. Ecology Letters 24: 2134-—2145.
15. **Landis MJ**, Edwards EJ, and Donoghue MJ. 2021. Modeling phylogenetic biome shifts on a planet with a past. Systematic Biology. 70: 86–107.
16. **Landis MJ**, Eaton DAR, Clement WL, Park B, Spriggs EL, Sweeney PW, Edwards EJ, and Donoghue MJ. 2021. Joint phylogenetic estimation of geographic movements and biome shifts during the global diversification of Viburnum. Systematic Biology. 70: 67–85.

2020

17. **‡Braga MP**, **Landis MJ**, Nylin S, Janz N, and Ronquist F. 2020. Bayesian inference of ancestral host-parasite interactions under a phylogenetic model of host repertoire evolution. Systematic Biology 69: 1149—1162.
    Awarded Best Paper in Systematic Biology in 2020.
18. Field DJ, Berv JS, Hsiang AY, Lanfear J, **Landis MJ**, Dornberg A. 2020. Timing the extant avian radiation: The rise of modern birds, and the importance of modeling molecular rate variation. Bulletin of the American Museum of Natural History 440: 159–181.
19. Kim AS, Zimmerman O, Nelson CA, Basore K, Zhang R, Desai C, Bullock C, Durnell L, Deem SL, Oppenheimer J, Shapiro B, Wang T, Coyne CB, Handley SA, **§Landis MJ**, §Fremont DH, and §Diamond MS. 2020. A sequence insertion in the Mxra8 receptor of Bovinae family members confers resistance to alphavirus infection. Cell Host & Microbe 27: 428-440.
20. Quintero I and **Landis MJ**. 2020. Interdependent phenotypic and biogeographic evolution driven by biotic interactions. Systematic Biology 69: 739–755.

2018

21. **Landis MJ**, Freyman WA, and Baldwin BG. 2018. Retracing the Hawaiian silversword radiation despite phylogenetic, biogeographic, and paleogeographic uncertainty. Evolution 72: 2343–2359.
22. Park B, Sinnott-Armstrong M, Schlutius C, Zuluaga, J-CP, Spriggs EL, Simpson RG, **Landis MJ**, Sweeney PW, Eaton DAR, and Donoghue MJ. 2018. Sterile marginal flowers increase visitation and fruit set in the hobblebush (Viburnum lantanoides, Adoxaceae) at multiple spatial scales. Ann. Bot. 123: 381-390.

2017

23. **Landis MJ** and Schraiber JG. 2017. Pulsed evolution shaped modern vertebrate body sizes. Proceedings of the National Academy of Sciences 114: 13224–13229.
24. Höhna S, **Landis MJ**, Heath TA. 2017. Phylogenetic inference using RevBayes. Current Protocols in Bioinformatics 57:6.16.1–6.16.34.
25. **Landis, MJ**. Biogeographic dating of speciation times using paleogeographically informed processes. 2017. Systematic Biology 66:128–144.

2016

26. Höhna S, **Landis MJ**, Heath TA, Boussau B, Lartillot N, Moore BR, Huelsenbeck JP, and Ronquist F. 2016. RevBayes: Bayesian phylogenetic inference using graphical models and an interactive model-specification language. Systematic Biology 65:726-736.

2015

27. Schraiber JG and **Landis MJ**. 2015. Sensitivity of quantitative traits to mutational effects and number of loci. Theoretical Population Biology 102:85–93.

2014 28. Höhna S, Heath TA, Boussau B, **Landis MJ**, Ronquist F, and Huelsenbeck JP. 2014. Probabilistic graphical model representation in phylogenetics. Systematic Biology 63:753–771.
29. **Landis MJ** and Bedford T. 2014. Phylowood: interactive web-based animations of biogeographic and phylogeographic histories. Bioinformatics 30:123–124.

2013 30. **Landis MJ**, Matzke NJ, Moore BR, and Huelsenbeck JP. Bayesian analysis of biogeography when the number of areas is large. 2013. Systematic Biology 62:789–804.
31. ***Landis MJ**, *Schraiber JG, and Liang M. 2013. Phylogenetic analysis using Lévy processes: finding jumps in the evolution of continuous traits. Systematic Biology 62:193–204.

Perspectives – Published

2023 1. Upham NS, **Landis MJ**. 2023. Genomics expands the mammalverse. Science. 380: 358-359.

Book Chapters – Published

2020 1. Landis MJ. Biogeographic dating of phylogenetic divergence times using priors and processes. 2020. In Ho SYW (ed.), The Molecular Evolutionary Clock: Theory and Practice. Springer.

Research Software

RevBayes, phylogenetic inference using graphical models	revbayes.github.io
phyddle, deep learning for phylogenetic models	github.com/mlandis/phyddle
BayArea, Bayesian biogeographic inference for many areas	github.com/mlandis/bayarea
pulsR, simulate and fit macroevolutionary trait models	github.com/Schraiber/pulsR
creepy-jerk, Bayesian inference of evolutionary jumps in traits	github.com/mlandis/creepy-jerk
Phylowood, interactive biogeographic animations	mlandis.github.io/phylowood

Presentations – Invited *: graduate student-invited

2024 Biology Seminar, Texas A&M University

2023 Integration of Speciation Seminar, European Society of Evoutionary Biologists (virtual)
Phyloseminar, Society of Systematic Biologists (virtual)
Standalone Meeting for the Society of Systematic Biologists, UNAM, Mexico City

2022 Meeting of Systematics, Biogeography, and Evolution (virtual)
*Melinda Denton Endowed Seminar on Plant Systematics, University of Washington
*Ecology and Evolution Seminar, University of Minnesota, Minneapolis (virtual)
Biodiversity Research Center Seminar, University of British Columbia, Vancouver (virtual)

2021 European Society of Evoutionary Biologists, Satellite Meeting (virtual)
Biology Seminar, University of Nebraska, Lincoln (virtual)
Statistics Seminar, Washington University in St. Louis (virtual)

2020 Biology Seminar, University of Missouri, St. Louis (virtual)
Living Earth Collaborative Seminar, Washington University in St. Louis (virtual)

2019 St. Louis Ecology, Evolution & Conservation Seminar, Lewis & Clark Community College
Biological Sciences Seminar, Auburn University

2018 Plant Biology Seminar, University of Georgia
Evolution & Systematics Seminar, University of Connecticut
Phyloseminar (virtual)
Department of Biology Seminar, University of Oregon
Department of Biology Seminar, Washington University in St. Louis

2017 Symposium on Computational Paleobiology, Geological Society of America, Seattle
Systematics Seminar, Swedish Museum of Natural History

2016 Computational Genomics Seminar, Temple University

2015	Symposium on Parametric Biogeography, Evolution Conference in Guaruja, Brazil
2013	Phylogenetics & Evolutionary Biology Seminar, North Carolina State University
	Workshop on Mathematics for an Evolving Biodiversity, University of Montréal
	Center for Population Genomics Seminar, UC Davis

Presentations – Contributed

2023	Evolution Conference in Albuquerque
2022	International Biogeography Society Conference (virtual)
2022	Evolution Conference (virtual)
2021	Evolution Conference (virtual)
2020	Midcontinent Paleobotanical Colloquium (virtual)
2019	Evolution Conference in Providence
	Yale Institute for Biospheric Studies Seminar
2017	External Advisory Board Meeting, Yale Institute for Biospheric Studies
	Evolution Conference in Portland
2016	Ernst Mayr Symposium, Evolution Conference, Austin
2013	Evolution Conference in Snowbird
	Center for Theoretical Evolutionary Genomics, UC Berkeley
2012	Center for Theoretical Evolutionary Genomics, UC Berkeley
	Evolution Conference in Ottawa

Professional Reviews

Journals	American Journal of Botany, Annals of Botany, Bioinformatics, BMC Evolutionary Biology, Evolution, Genome Biology & Evolution, Journal of Biogeography, Methods in Evolution & Ecology, Molecular Biology & Evolution, Molecular Phylogenetics & Evolution, Nature Communications, New Phytologist, Paleobiology, Proceedings of the Royal Society B, Proceedings of the National Academy of Sciences USA, Science, Systematic Biology, Trends in Ecology & Evolution, Zoological Journal of the Linnean Society
Grants	NSF reviewer, SSB Ernst Mayr applications, SSB graduate award grants

University Service

2019—	Steering Committee, Ecology & Evolutionary Biology Steering Committee
2019—	Admissions Committee, Ecology & Evolutionary Biology Steering Committee

Departmental Service

2023—	Member, Biology Faculty Excellence Task Force
2022—2023	Member, Hiring Committee for Genetics & Genomics Faculty
2022	Member, Hiring Committee for Urban Biology & Environmental Justice Faculty
2019—	Member, Spector & Quatrano Awards Committee
2019—	Member, WUSTL Biology Curriculum Committee
2012—2013	Co-chair, Integrative Biology Graduate Student Assembly, UC Berkeley

Society Service

2023—	Co-organizer for Society for Systematic Biologists Mentoring Program
2023	Co-creator of new Society for Systematic Biologists Mentoring Program
2022—	Associate Editor for Systematic Biology
2021—	Member of Society for Systematic Biologists Legacy Committee (SSB history, etc.)
2021—2023	Faculty mentor for WUSTL Chapter within the Society for Advancement of Chicanos/Hispanics and Native Americans in Science
2021—2023	One-off ERC mentor for Evolution meeting

2019—2022 Council member for Society for Systematic Biologists
2018—2022 Editorial board member for Systematic Biology
2019 Symposium organizer for Society of Systematic Biologists on The Bright Side of Phylogenetics

Teaching & Courses

2020—2024 Instructor, BIOL 4220, Practical Bioinformatics, WUSTL
4 units, 10-12 undergrad students, 2-3 PhD students
[not taught 2023 due to Covid-19 exemption]
2021, 2024 Instructor, BIOL 580, EEB Graduate Seminar, WUSTL
2 units, 5-10 PhD students

Guest Instructor

2022 Invited Lecturer, EEB 103, Statistical Phylogenetics & Speciation, UC Davis
2016 Invited Lecturer, BIOL 1425, Phylogenetic Biology, Brown University
2014 Invited Lecturer, IB 87, Bioinformatics, UC Berkeley
2013 Invited Lecturer, EEB 101, Macroevolution, UC Davis

Teaching Assistance

2012 Teaching Assistant, IB200A, Principles of Phylogenetics, UC Berkeley
2011 Teaching Assistant, IB164, Human Genetics and Genomics, UC Berkeley

Research Lab Mentoring & Advising

WUSTL Postdoctoral Scholar
2023— Albert Soewongsono, Mathematical Phylogenetics
2021—2024 Fábio Mendes, Computational Phylogenetics
Starting as Assistant Professor at Louisiana State University
2019—2021 Mariana Braga, Insect-Plant Co-Evolution
Starting as Assistant Professor at Swedish University of Agricultural Sciences

ORISE Postdoctoral Scholar (academic mentor)
2021— Ammon Thompson, Statistical Epidemiology

WUSTL PhD Student (advised)
2021— Sarah Swiston, EEB
2022— Sean McHugh, EEB
2024— Raymond Castillo, EEB

WUSTL Undergraduate
2023— Lilja Quinn, Biology
2023— Tanvi Gorre, Biology
2023 Jonathan Liu, Biology & Mathematics
2022—2023 Yu (Sunny) Zichen, Mathematics & Computer Science
2021—2023 Walker Sexton, Biology
2021—2023 Mihir Shah, Biomedical Engineering
2021 Ernie Ramos, Mathematics

UC Berkeley Undergraduate
2013—2015 Bryan Wang, Mathematics
2012—2014 Jaya Narasimhan, Computer Science

Research Lab Member Awards & Fellowships

2022 NSF Graduate Research Fellowship to Sarah Swiston
2022 WUSTL ExCELS International Postdoctoral Presentation Winner to Fábio Mendes
2021 McNair Scholars Fellowship to Ernie Ramos
2021 Swedish Research Council International Postdoc Fellow to Mariana Braga
2021 ORISE Postdoctoral Fellowship to Ammon Thompson
2020 Systematic Biology Publisher's Award to Mariana Braga [doi:10.1093/sysbio/syaa019]

PhD Program Mentoring & Advising

WUSTL PhD Student (rotation)

2024 Grace Coppinger, EEB
2024 Graham Bachman, CSB
2023 Raymond Castillo, EEB
2023 David Hernandez, EEB
2023 Clinton Jules, CSE
2022 Preston Pennington, EEB
2021 Sean McHugh, EEB
2020 Sarah Swiston, EEB
2020 Justin Baldwin, EEB
2020 Aryeh Miller, EEB

WUSTL dissertation committee member

2023— Sean McHugh, EEB
2023— Eduardo Aguirre Mazzi, EEB
2023— Cheyenne Morris, PMB
2022— Ethan Abercrombie, EEB
2022— Sarah Swiston, EEB
2022— Justin Baldwin, EEB
2022— Aryeh Miller, EEB
2022— Changxu Fan, Pathology & Immunology
2022— Jenna Lin, BBSB
2021— Jhan Salazar, EEB
2023—2024 Yeganeh Sekhavati, Anthropology
2021—2024 Brock Mashburn, EEB
2020—2024 Wen-Hsi Kuo, EEB
2020—2022 Erika Schumacher, EEB
2019—2021 Rachel Lyman, MOBOT
2020 Qi Wang, Statistics

Visiting Scholars

2023— Matheus Noguiera Pontes, PhD student, UFABC, Brazil
2019 Emilia Wendt, PhD student, UFRGS, Brazil

Outreach

2024 Organizer & Instructor, Phylogenetic Biogeography Workshop, WUSTL
2021 Instructor, Stay-at-Home RevBayes Workshop (virtual)
2020 Instructor, Stay-at-Home RevBayes Workshop (virtual)
2018—2019 Instructor, Molecular Evolution Workshop, Woods Hole
2019 Instructor, Bodega Phylogenetics Workshop, UC Davis
2019 Instructor, RevBayes Workshop, Yale University, New Haven

2017	Instructor, Fossil tip-dating with RevBayes, GSA Meeting, Seattle
2017	Instructor, Biogeography with RevBayes, SSB Meeting, Baton Rouge
2017	Instructor, Introduction to RevBayes, Yale, New Haven
2014—2016	Teaching Assistant, Molecular Evolution Workshop, Woods Hole
2015	Instructor, RevBayes Workshop, UC Berkeley
2014, 2015	Instructor, Bodega Phylogenetics Workshop, UC Davis
2014	Instructor, Applied Phylogenetics Workshop, NESCent
2014, 2015	Guest Lecturer, Berkeley High School Science Outreach
2014	Guest Lecturer, Bay Area Scientists in Schools
2009—2010	Tutor, 826 Valencia volunteer for English Language Learners

Professional Societies

2010—	Society of Systematic Biologists
2012—	Society for the Study of Evolution
2018—	International Biogeography Society
2021—	Society for Advancement of Chicanos/Hispanics and Native Americans in Science
2017—2020	Geological Society of America

Professional Experience

2005—2008	IT Consultant, Varsity Technologies, San Francisco, CA

Advisors

PhD	John P. Huelsenbeck Department of Integrative Biology UC Berkeley
Postdoctoral	Tracy A. Heath Department of Ecology, Evolution, and Organismal Biology Iowa State University
Postdoctoral	Michael J. Donoghue Department of Ecology and Evolutionary Biology Yale University