

## Michael James Landis

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[landislab.org](http://landislab.org)

*Last updated: Jul 07, 2023*

### Education

2015 Ph.D. Integrative Biology  
*Designated Emphasis in Computational & Genomic Biology*  
University of California, Berkeley, CA

2005 B.S. 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 statistical phylogenetics, historical biogeography, the evolution of ecological interactions, phenotypic evolution, and epidemiology. My methodological interest includes stochastic processes, model design, Bayesian inference, deep learning, and programming. My work typically involves the development of 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

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 WUSTL)

### Internal grants

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

### Submitted external grants

- 2023 NSF BII: “Institute for Vector-Borne System Dynamics: Integrating across Biological Scales to Understand Pathogen Transmission” Requested \$15M to Pls Losos (Lead), Adalsteinsson, Boon, Brisson, Bente, Deem, Flowers, Landis. (\$11M to WUSTL, declined)
- 2022 NSF EEID & NIH FIC: “Phylogenetic modeling of viral transmission dynamics at the human wildlife interface in Uganda” Requested \$3M to Pls Milich (Lead), Landis, Wang (\$3M to WUSTL)
- 2023 NSF DEB: “Diversity, function, biogeography, and phylogeny of the freshwater riverine microbiome in North America: mapping the known and unknown.” Requested \$2M to Pls Ling (Lead), Landis, Knouft (\$1.4M to WUSTL).

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

### Manuscripts – Under Review

- 2023 1. **#Swiston SK, Landis MJ**. 2023. Testing relationships between multiple regional features and biogeographic processes of speciation, extinction, and dispersal bioRxiv 2023.06.19.545613.
2. **‡Thompson A**, Liebeskind B, Scully EJ, **Landis MJ**. 2023. Deep learning approaches to viral phylogeography are fast and as robust as likelihood methods to model misspecification. bioRxiv 2023.02.08.527714.

### Manuscripts – Published

- 2023 1. Upham NS, **Landis MJ**. 2023. Genomics expands the mammalverse. *Science*. 380: 358-359.
2. 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.
3. Quintero IM, **Landis MJ**, Jetz W, Mórłón H. 2023. The build-up of the present-day tropical diversity of tetrapods. Accepted. *Proceedings of the National Academy of Sciences* 120:e2220672120.
4. 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 5. 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.
6. 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.
7. 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.
8. Wendt EW, Malabarba LR, **‡Braga MP**, Boeger WA, **Landis MJ**, Carvalho TP. Phylogeny, species delimitation, and ecological and morphological diversity of Characithecium (Monogeneoidea: Dactylogyridae). 2022. *Parasitology* 149: 700–716.
9. **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.

10. 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 11. Höhna S, **Landis MJ**, and Huelsenbeck JP. 2021. Parallel power posterior analyses for fast computation of Bayes factors in phylogenetics. *PeerJ*: 9:e12438.
12. **‡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.
13. **Landis MJ**, Edwards EJ, and Donoghue MJ. 2021. Modeling phylogenetic biome shifts on a planet with a past. *Systematic Biology*. 70: 86–107.
14. **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 15. **‡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.*
16. 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.
17. 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.
18. Quintero I and **Landis MJ**. 2020. Interdependent phenotypic and biogeographic evolution driven by biotic interactions. *Systematic Biology* 69: 739–755.
- 2018 19. **Landis MJ**, Freyman WA, and Baldwin BG. 2018. Retracing the Hawaiian silversword radiation despite phylogenetic, biogeographic, and paleogeographic uncertainty. *Evolution* 72: 2343–2359.
20. 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 21. **Landis MJ** and Schraiber JG. 2017. Pulsed evolution shaped modern vertebrate body sizes. *Proceedings of the National Academy of Sciences* 114: 13224–13229.
22. Höhna S, **Landis MJ**, Heath TA. 2017. Phylogenetic inference using RevBayes. *Current Protocols in Bioinformatics* 57:6.16.1–6.16.34.
23. **Landis, MJ**. Biogeographic dating of speciation times using paleogeographically informed processes. 2017. *Systematic Biology* 66:128–144.
- 2016 24. 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 25. Schraiber JG and **Landis MJ**. 2015. Sensitivity of quantitative traits to mutational effects and number of loci. *Theoretical Population Biology* 102:85–93.
- 2014 26. 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.
27. **Landis MJ** and Bedford T. 2014. Phylowood: interactive web-based animations of biogeographic and phylogeographic histories. *Bioinformatics* 30:123–124.

- 2013      28. **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.
29. **\*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.

### 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	<a href="https://revbayes.github.io">revbayes.github.io</a>
BayArea, Bayesian biogeographic inference for many areas	<a href="https://github.com/mlandis/bayarea">github.com/mlandis/bayarea</a>
pulsR, simulate and fit macroevolutionary trait models	<a href="https://github.com/Schraiber/pulsR">github.com/Schraiber/pulsR</a>
creepy-jerk, Bayesian inference of evolutionary jumps in traits	<a href="https://github.com/mlandis/creepy-jerk">github.com/mlandis/creepy-jerk</a>
Phylowood, interactive biogeographic animations	<a href="https://mlandis.github.io/phylowood">mlandis.github.io/phylowood</a>
qtc, trait evolution under the coalescent	<a href="https://github.com/Schraiber/quant_trait_coalescent">github.com/Schraiber/quant_trait_coalescent</a>

### Presentations – Invited

\*: graduate student invited

- 2023      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 Evolutionary 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, an online society-sponsored seminar (<http://phyloseminar.org/>)  
             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 Guarujá, 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, 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—	EEPB Steering Committee
2019—	EEPB Admissions Committee

### Departmental Service

2023—	Biology Faculty Excellence Task Force
2022—2023	Hiring Committee for Genetics & Genomics Faculty
2022	Hiring Committee for Urban Biology & Environmental Justice Faculty
2019—	Spector & Quatrano Awards Committee
2019—	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—	Legacy Committee member for Society for Systematic Biologists (society history, etc.)
2021—	Faculty mentor for WUSTL Chapter within the Society for Advancement of Chicanos/Hispanics and Native Americans in Science
2021, 2022	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—2022	Instructor, BIOL4220, Practical Bioinformatics, WUSTL
2022	Invited Lecturer, EEB103, Statistical Phylogenetics & Speciation, UC Davis
2021	Instructor, BIOL580, EEPB Graduate Seminar, WUSTL
2016	Invited Lecturer, BIOL1425, Phylogenetic Biology, Brown University
2014	Invited Lecturer, IB87, Bioinformatics, UC Berkeley
2013	Invited Lecturer, EEB101, 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— Fábio Mendes, Computational Phylogenetics  
2019—2021 Mariana Braga, Evolution & Ecology

*ORISE Postdoctoral Scholar (academic mentor)*

2021— Ammon Thompson, Statistical Epidemiology

*WUSTL PhD Student (advised)*

2021— Sarah Swiston, EEPB  
2022— Sean McHugh, EEPB

*WUSTL Undergraduate*

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

**PhD Program Mentoring & Advising***WUSTL PhD Student (rotation)*

2023— Clinton Jules, CSE  
2022 Preston Pennington, EEPB  
2021 Sean McHugh, EEPB  
2020 Sarah Swiston, EEPB  
2020 Justin Baldwin, EEPB  
2020 Aryeh Miller, EEPB

*WUSTL dissertation committee member*

2023— Yeganeh Sekhavati, Anthropology  
2022— Justin Baldwin, EEPB  
2022— Aryeh Miller, EEPB  
2022— Changxu Fan, Immunology  
2022— Jenna Lin, BBSB  
2021— Brock Mashburn, EEPB  
2021— Jhan Salazar, EEPB  
2020— Wen-Hsi Kuo, EEPB  
2020—2022 Erika Schumacher, EEPB (graduated)  
2020 Qi Wang, Statistics

**Outreach**

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**

2009—	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
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**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