

## Michael James Landis

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

*Last updated: Feb 17, 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  
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 current interests include statistical phylogenetics, historical biogeography, the evolution of ecological interactions, phenotypic evolution, pathogen host-switching, stochastic processes, model design, Bayesian inference, and deep learning. My work typically involves the design of 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 (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

### 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

## Manuscripts – Under Review

‡: group postdoc co-author

- 2023
1. ‡A Thompson, B Liebeskind, EJ 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.
  2. Quintero IM, **Landis MJ**, Jetz W, Mórion H. 2023. The build-up of the present-day tropical diversity of tetrapods. *bioRxiv* 2022.12.05.519156.

## Manuscripts – Accepted

‡: group postdoc co-author

- 2023
1. Kawahara AY, Storer C, Carvalho APS, Plotkin DM, Condamine F, ‡Braga MP, ..., **Landis MJ**, ..., Lohman DJ. Evolution and diversification dynamics of butterflies. Accepted. *Nature Ecology & Evolution*.

## Manuscripts – Published

‡: group postdoc co-author; \*: shared first author; §: shared corresp. author

- 2023
1. 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
2. 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.
  3. 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 and Evolution*. doi:10.1038/s41559-022-01823-x.
  4. 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.
  5. 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.
  6. **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.
  7. 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
8. Höhna S, **Landis MJ**, and Huelsenbeck JP. 2021. Parallel power posterior analyses for fast computation of Bayes factors in phylogenetics. *PeerJ*: 9:e12438.
  9. ‡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.
  10. **Landis MJ**, Edwards EJ, and Donoghue MJ. 2021. Modeling phylogenetic biome shifts on a planet with a past. *Systematic Biology*. 70: 86–107.
  11. **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
12. ‡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.*

13. 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.
14. 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.
15. Quintero I and **Landis MJ**. 2020. Interdependent phenotypic and biogeographic evolution driven by biotic interactions. *Systematic Biology* 69: 739–755.
- 2018 16. **Landis MJ**, Freyman WA, and Baldwin BG. 2018. Retracing the Hawaiian silversword radiation despite phylogenetic, biogeographic, and paleogeographic uncertainty. *Evolution* 72: 2343–2359.
17. 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 18. **Landis MJ** and Schraiber JG. 2017. Pulsed evolution shaped modern vertebrate body sizes. *Proceedings of the National Academy of Sciences* 114: 13224–13229.
19. Höhna S, **Landis MJ**, Heath TA. 2017. Phylogenetic inference using RevBayes. *Current Protocols in Bioinformatics* 57:6.16.1–6.16.34.
20. **Landis, MJ**. Biogeographic dating of speciation times using paleogeographically informed processes. 2017. *Systematic Biology* 66:128–144.
- 2016 21. 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 22. Schraiber JG and **Landis MJ**. 2015. Sensitivity of quantitative traits to mutational effects and number of loci. *Theoretical Population Biology* 102:85–93.
- 2014 23. 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.
24. **Landis MJ** and Bedford T. 2014. Phylowood: interactive web-based animations of biogeographic and phylogeographic histories. *Bioinformatics* 30:123–124.
- 2013 25. **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.
26. **\*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, 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 ( <a href="http://phyloseminar.org/">http://phyloseminar.org/</a> ) 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**

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, Methods in Ecology & Evolution, 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
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Grants                NSF reviewer, SSB Ernst Mayr applications, SSB graduate award grants

### **University Service**

2022                Hiring Committee for Genetics & Genomics Faculty  
2022                Hiring Committee for Urban Biology & Environmental Justice Faculty  
2021—              Faculty mentor for WUSTL Chapter within the Society for Advancement of  
Chicanos/Hispanics and Native Americans in Science  
2019—              WUSTL Biology Curriculum Committee  
2019—              EEPB Steering Committee  
2019—              EEPB Admissions Committee  
2012—2013        Co-chair, Integrative Biology Graduate Student Assembly, UC Berkeley

### **Society Service**

2022—              Associate Editor for Systematic Biology  
2021—              Legacy Committee member for Society for Systematic Biologists  
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*

2021—              Fábio Mendes, Statistical Phylogenetics  
2019—2021        Mariana Braga, Evolution & Ecology

#### *ORISE Postdoctoral Scholar*

2021—              Ammon Thompson, Statistical Epidemiology

#### *WUSTL PhD Student (advised)*

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

#### *WUSTL Undergraduate*

2022—              Yu (Sunny) Zichen, Mathematics  
2021—              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)*

2022             Preston Pennington, EEPB  
2020             Justin Baldwin, EEPB  
2020             Aryeh Miller, EEPB

##### *WUSTL dissertation committee member*

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-His Kuo, EEPB  
2020—2022     Erika Schumacher, EEPB  
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

#### **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