

## ERIN L. LANDGUTH

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### Education

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2010. *Ph.D. in Mathematical and Computational Ecology*  
Dissertation: Mathematical and computational applications in disease and landscape ecology.  
University of Montana – Missoula, MT (Advisors: E. Stone, S. Cushman)
2004. *M.S. in Atmospheric Sciences*  
Thesis: Texture and spatial complexity analysis in remote sensing.  
SD School of Mines and Technology – Rapid City, SD (Advisor: P. Zimmerman)
2002. *B.S. in Mathematics\**  
Undergraduate Thesis: Shuttle mechanic maneuvers and orbital mechanics.  
SD School of Mines and Technology – Rapid City, SD (Advisor: D. Teets)  
\* 2013 Outstanding Recent Graduate Award

### Research & Work Experience

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- 2010 – . *Director, Computational Ecology Laboratory, Division of Biological Sciences, University of Montana – Missoula, MT*  
Established the Computational Ecology Laboratory (CEL: <http://cel.dbs.umt.edu>), the largest high performance computer laboratory on campus. My vision and research focus is to develop, optimize, and apply individual-based simulation programs for understanding relationships between biological processes, environment, and climate with population patterns across landscapes. My goal is to produce tools that will be valuable to natural resources managers, planners, decision makers, and scientists with a stake in maintaining biodiversity, from genes to ecosystems. I have coordinated multiple research grants and worked with researchers from around the world, on projects ranging from simulating rates of adaptation and evolutionary change in organisms across landscapes, to developing predictive space-time models of insect spread across the Western US. CEL members that I have supervised and supported include software engineers, GIS analysts, and students/post docs across computer science, computational biology, quantitative statistics, and landscape genetics.  
Supervisor: Dean Charlie Janson
- 2010 – . *Research Assistant Professor, Division of Biological Sciences, University of Montana – Missoula, MT*  
I have led and successfully funded numerous research grants and brought nearly \$4,000,000 to the University of Montana through the Computation Ecology Lab. The broad focus of this work is aimed at understanding the consequences of land use and climate change on the movement patterns, genetics, and connectivity of terrestrial and aquatic species. I apply my training and conduct research across a range of disciplines, including conservation and computational biology, landscape ecology, population and landscape genetics, and evolutionary biology. I collaborate with a diverse group of land managers, stakeholders, and scientists on basic and applied research questions related

to both terrestrial and aquatic resource management and conservation issues. I have developed software programs, analytical tools, and web-based interactive platforms in response to scientific and land management needs.

Supervisor: Dean Charlie Janson

\* 2013-2014 Merit Award recommended under faculty evaluation and approved by Dean Chris Comer.

\* 2014-2015 Merit Award recommended under faculty evaluation and approved by Dean Chris Comer.

2008. *Research Assistant, RMRS-USDA-FS, University of Montana – Missoula, MT*  
Research: Developing and applying an agent based model for adaptive evolution in complex and nonequilibrium environments.  
Supervisor: S. Cushman
2008. *NSF EAPSI Fellow, Mathematics Department, University of Auckland – Auckland NZ*  
Research: Modeling temporally-forced disease dynamics in a relapsing host-vector community.  
Supervisor: V. Kirk
2007. *MEID Internship, Computer Science Department, University of California – Davis, CA*  
Research: A cellular automata SIR model for landscape epidemiology.  
Supervisor: J. Crutchfield
- 2006 – 2010. *NSF IGERT Trainee, Ecology of Infectious Diseases, University of Montana – Missoula, MT*  
Research: Interdisciplinary and collaborative research for understanding the structure, dynamics, genetics, and behavior of host organisms and pathogens and the complex interplay between host, pathogen, and environment at multiple spatial and temporal scales.  
Supervisors: E. Stone, S. Cushman, B. Holben
2006. *Outreach GEMS Coordinator, Walter Reed AIR – Washington D.C. & Polson, MT*  
Coordinator of the Gains in the Education of Mathematics and Science (GEMS), based on a multi-disciplinary educational curriculum, and focused on age- and grade-appropriate hands-on activities, in areas such as science, engineering, mathematics, computational sciences, computational biology, biomedical sciences, chemistry and biology.  
Supervisor: M. Jett
2005. *Professional Engineering Associate, RESPEC, Inc. – Rapid City, SD*  
Contractor: Responsible for numerous software products and GIS toolboxes for mobile mapping devices designed for environmental remediation sites.  
Supervisor: D. Hoyer
2004. *Research Scholar, Santa Fe Institute, Santa Fe, NM*  
Research: Embedding and Fourier analysis on Ameriflux data.  
Supervisors: J. Crutchfield
2004. *Research Assistant, Institute of Atmospheric Science, SD School of Mines and Technology – Rapid City, SD*

Research: Spatial complexity and texture analysis in remote sensory imagery. Cellular automata modeling for plague in prairie dog populations for the Fort Belknap Reservation.

Supervisors: P. Zimmerman, L. Vierling, M. Price

## Refereed Publications

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1. Smith A, **Landguth EL**, Banks S, M Bull, D Driscoll, M Gardner (2016) Disturbance and succession influence genetic diversity through habitat-mediated dispersal. *Royal Society Proceedings B*.
2. Johnson TL, **Landguth EL**, Stone E (2016) Modeling relapsing disease dynamics in a host vector community. *PLoS Neglected Tropical Diseases*. 10.1371/journal.pntd.0004428.
3. Davies, ID, Cary GJ, **Landguth EL**, Lindenmayer DB, Banks SC (2016) Implications of recurrent disturbance for genetic diversity. *Ecology and Evolution*.
4. Forester B, Jones M, Joost S, **Landguth EL**, Lasky J (2015) Detecting spatial genetic signatures of local adaptation in heterogeneous landscapes. *Molecular Ecology*.
5. Scribner K, Lowe W, **Landguth EL**, et al. (2015) Applications of Genetic Data to Improve Management and Conservation of River Fishes and Their Habitats. *Fisheries*.
6. **Landguth EL**, Johnson NJ, Cushman SA (2015) Clusters of incompatible genotypes evolve with limited dispersal. *Frontiers in Genetics, Evolutionary and Population Genetics*. doi:0.3389/fgene.2015.00151
7. Beheregaray LB, **Landguth EL**, Cooke GM (2015) Ecological Speciation in the Tropics: Insights from Comparative Phylogeography and Landscape Genetics of Amazonian Fishes. Special section *Frontiers in Genetics* entitled "Origin of tropical diversity: from clades to communities". 10.3389/fgene.2014.00477.
8. Cushman SA, Lewis J, **Landguth EL** (2014) Why did the bear cross the road? Comparing performance of multiple resistance surfaces and connectivity modeling methods. *Diversity*, 6, 844-854. doi:10.3390/d6040844.
9. **Landguth EL**, Muhlfeld CC, Waples, RS, Jones L, Lowe WH, Lucotch J, Neville H, Luikart G (2014) Combining demographic and genetic factors to map population vulnerability in stream species. *Ecological Applications*. 24, 1505–1524.
10. Hand BK, **Landguth EL**, Cushman SA (2014) Assessing multi-taxa sensitivity to the human footprint, habitat fragmentation and loss by exploring alternative scenarios of dispersal ability and population size. *Biodiversity and Conservation*. 10.1007/s10531-014-0747-x.
11. Cooke GM, **Landguth EL**, Beheregaray LB (2014) Riverscape genetics and replicated ecological speciation across an Amazonian ecotone. *Evolution*. DOI: 10.1111/evo.12410.
12. Noonan CW, Conway K, **Landguth EL**, McNew T, Pfau J, Black B, Szeinuk J, Flores R (2014) Multi-pathway exposure assessment for an asbestos-exposed Superfund community. *Journal of Exposure Science and Environmental Epidemiology*. doi:10.1038/jes.2014.25.
13. Hand BK, Chen S, Anderson N, Beja-Pereira A, Cross PC, Ebinger M, Edwards H, Garrott RA, Kardos M, Kauffman M, **Landguth EL**, Middleton A, Schwartz M, Scurlock B, White PJ, Zager P, Luikart G (2014) Limited maternal gene flow among elk herds in the Greater Yellowstone Ecosystem revealed by mtDNA. *Journal of Fish and Wildlife Management*.
14. **Landguth EL**, Schwartz MK (2014) Optimizing sampling allocation and effort in landscape genetic studies for discrete and continuously distributed individuals. *Conservation Genetics*.
15. Jones MR, Forester BR, Teufel AI, Adams RV, Anstett DN, Goodrich BA, Joost S, Manel S, **Landguth EL** (2014) Integrating spatially-explicit approaches to detect adaptive loci in a landscape genomics context. *Evolution (Special Issue: Evolutionary Landscape Genetics)*, 67, 3455-3468.
16. Cushman SA, Lewis JS, **Landguth EL** (2014) Evaluating the intersection of a regional wildlife connectivity network with highways. *Movement Ecology*, doi:10.1186/2051-3933-1-12

17. Cushman, SA, Landguth EL (2013) Evaluating Population Connectivity for Species of Conservation Concern in the American Great Plains. *Biodiversity and Conservation*, DOI: 10.1007/s10531-013-0541-1.
18. Cushman, SA, Wasserman TN, **Landguth EL**, Shirk A (2013) Re-evaluating casual modeling with Mantel tests in landscape genetics. *Diversity (Special Issue: Genetic Diversity and Molecular Evolution)*, 5, 51-72.
19. Oyler-McCance SJ, Fedy BC, **Landguth EL** (2013) Sample design effects in landscape genetics. *Conservation Genetics*, 14, 275–285.
20. Cushman SA, Shirk AJ, **Landguth EL** (2013) Landscape genetics and limiting factors. *Conservation Genetics*, 14, 263-274.
21. Wasserman T, Cushman SA, Littel JS, Shirk AJ, **Landguth EL** (2013) Population connectivity and genetic diversity of American marten (*Martes americana*) in the United States northern Rocky Mountains in a climate change context. *Conservation Genetics*, 14, 529-541.
22. **Landguth EL**, Balkenhol N (2012) Relative sensitivity of neutral versus adaptive genetic data for assessing population differentiation. *Conservation Genetics*, 13, 1421-1426.
23. Blair C, Weigel DE, Balazik M, Keeley ATH, Walker FM, **Landguth EL**, Cushman S, Murphy M, Waits L, Balkenhol N (2012) A simulation-based evaluation of methods for inferring linear barriers to gene flow. *Molecular Ecology Resources*, 12, 822-833.
24. Shirk AS, Cushman SA, **Landguth EL** (2012) Simulating pattern-process relationships to validate landscape genetic models. *International J. Ecology*, doi:10.1155/2012/539109.
25. Cushman SA, **Landguth EL** (2012) Multi-taxa population connectivity in the Northern Rocky Mountains. *Ecological Modelling*, 231, 101-112.
26. Cushman SA, Shirk AS, **Landguth EL** (2012) Separating the effects of habitat area fragmentation and matrix resistance on genetic differentiation in complex landscapes. *Landscape Ecology*, 27, 369-380.
27. Graves TA, Wasserman TN, Ribeiro M, **Landguth EL**, Spear SF, Balkenhol N, Higgins CB, Fortin M-J, Cushman SA, Waits LP (2012) The influence of landscape characteristics and home-range size on the quantification of landscape-genetics relationships. *Landscape Ecology*, 27, 253-266.
28. Muhlfeld CC, D'Angelo V, Kalinowski ST, **Landguth EL**, Downs CC, Tohtz J, Kershner JL (2012) A fine-scale assessment of using barriers to conserve native stream salmonids: A case study in Akokala Creek, Glacier National Park, USA. *The Open Fish Science Journal*, 5, 9-20.
29. **Landguth EL**, Cushman SA, Johnson NA (2012) Simulating natural selection in landscape genetics. *Molecular Ecology Resources*, 12, 363-368.
30. **Landguth EL**, Fedy B, Garey A, Mumma M, Emel S, Oyler-McCance S, Cushman SA, Wagner HH, Fortin MJ (2012) Effects of sample size, number of markers, and allelic richness on the detection of spatial genetic pattern. *Molecular Ecology Resources*, 12, 276-284.
31. **Landguth EL**, Hand BK, Glassy JM, Cushman SA, Sawaya M (2012) UNICOR: a species corridor and connectivity network simulator. *Ecography*, 12, 9-14.
32. **Landguth EL**, Muhlfeld CC, Luikart G (2012) CDFISH: an individual-based, spatially-explicit, landscape genetics simulator for aquatic species in complex riverscapes. *Conservation Genetics Resources*, 4, 133-136.
33. Wasserman TN, Cushman SA, Shirk AS, **Landguth EL**, Littel JS (2011) Simulating the effects of climate change on population connectivity of American marten (*Martes americana*) in the northern Rocky Mountains, USA. *Landscape Ecology*, doi:10.1007/s1098001196538.
34. Balkenhol N, **Landguth EL** (2011) Simulation modeling in landscape genetics: on the need to go further, *Molecular Ecology*, 20, 667-670.
35. Short Bull R, Cushman SA, Mace R, Chilton T, Kendall K, **Landguth EL**, Schwartz MK, McKelvey K, Allendorf FW, Luikart G (2011) Why replication is important in landscape genetics: case of the American black bear in the Rocky Mountains. *Molecular Ecology*, 20, 1092-1107.

36. **Landguth EL**, Cushman SA, Schwartz MK, Murphy M, McKelvey KS, Luikart G (2010) Quantifying the lag time to detect barriers in landscape genetics. *Molecular Ecology*, 19, 4179-4191.
37. **Landguth EL**, Cushman SA, Murphy M, Luikart G (2010) Relationships between migration rates and landscape resistance assessed using individual-based simulations. *Molecular Ecology Resources* (Special Issue: Methodological Advances – Inference of Spatial Structure), 10, 854-862.
38. Cushman SA, **Landguth EL** (2010) Spurious correlations and inferences in landscape genetics. *Molecular Ecology*, 19, 3592-3602.
39. Cushman SA, **Landguth EL** (2010) Scaling landscape genetics. *Landscape Ecology*, 25, 967 -979.
40. Landguth EL, Cushman SA (2010) CDPOP: a spatially explicit cost distance population genetics program. *Molecular Ecology Resources*, 10, 156-161.

### **Other Publications/Books**

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1. **Landguth EL**, Cushman SA, Balkenhol N (2015) Chapter 6: Simulation modeling in landscape genetics. In *Landscape Genetics* eds. Balkenhol N, Waits L, Cushman S. Wiley, London. pp 99-116.
2. Landguth, E.L., Holden, Z.A., Mahalovich, M.F. (2015) A landscape genomics simulation framework for assisted migration in Whitebark Pine across the northern Rocky Mountains, USA. *USDA Forest Health & Protection Report*. pp 42.
3. Holden ZA, Jolly WM, Parson R, Warren A, **Landguth EL**, Abatzoglou J (2013) TOPOFIRE: A system for monitoring insect and climate induced impacts on fire danger in complex terrain. Consortium for Integrated Climate Research in Western Mountains.
4. Muhlfeld C, Jones LA, Al-Chokhachy R, Luikart G, **Landguth EL** (2012) Conference Paper: Using spatially explicit models to assess potential effects of climate warming on native salmonids in the Northern Rockies. American Fisheries Society 142<sup>nd</sup> Annual Meeting.
5. Cushman SA, **Landguth EL**, Flather CH (2011) Phase I: Climate change and connectivity: Assessing landscape and species vulnerability. Final Report to Great Plains Landscape Conservation Cooperative. Fort Collins, CO: U. S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 103 p.

### **Manuscripts Submitted**

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1. Franckowiak R, Panasci M, Jarvis K, Acuna-Rodriguez I, **Landguth EL**, Fortin M-J, Wagner HH (*in revisions*) Model selection with multiple regression on distance matrices leads to incorrect inferences. *Molecular Ecology Resources*.
2. Zeller K, Creech T, Millette K, Long R, Balkenhol N, Wagner HH, **Landguth EL** (*in revisions*) Evaluating current techniques in landscape genetic inference. *Ecology and Evolution*.
3. **Landguth EL**, Bearlin A, Day C, Dunham J (*in review*) CDmetaPOP: an eco-evolutionary metapopulation simulation model for population viability analysis in landscape and riverscape genetics. *Methods in Ecology and Evolution*.
4. Kristensen TV, Puckett EE, **Landguth EL**, Hast J, Carpenter C, Sajecki JL, Belant JL, Berringer J, Means M, Cox J, Van Den Bussche RA, Eggert LS, White Jr D, Smith KG (submitted) Individual and population variation in dispersal of American black bears (*ursus americanus*). *Heredity*.
5. Creech T, Epps C, Landguth EL, Crowhorst R (submitted) Landscape resistance to gene flow for desert bighorn sheep in diverse habitats: implications for adaptation to changing environments. *Molecular Ecology*.
6. Cushman S, **Landguth EL** (submitted) Heterogeneous selection accelerates evolution of reproductive isolation in complex landscapes. *Frontiers in Genetics*, section Evolutionary and Population Genetics.

7. Roffler G, **Landguth EL**, Schwart M, Luikart G (submitted) Detecting natural selection across environmental gradients: A performance evaluation of statistical genetic methods using simulations". *Molecular Ecology*.
8. Kraus R, ..., **Landguth EL**, et al. (submitted) An existing solution for journal shopaholics. *Nature*.
9. Palmer C, **Landguth EL**, Stone E (submitted) The dynamics of vector-borne relapsing diseases. *Journal of Mathematical Biology*.

### **Manuscripts in Preparation**

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1. Holden Z, **Landguth EL**, Purdy J (*in prep*) Modeling the spread of mountain pine beetle with space-time dependent environmental predictions.
2. Banks S, **Landguth EL** (*in prep*) Temporal dynamics versus changing landscapes: implications for landscape genetics inference.
3. Mims M, Day C, Hinkle J, Fuller M, Burkhart J, Bearlin A, DeHann P, Holden Z, **Landguth EL** (*in prep*) Riverscape genetics simulation framework for Bull Trout reintroductions.
4. Day C, Bearlin A, **Landguth EL** (*in prep*) Riverscape genetics simulation framework for Eastern Brook Trout suppression and eradication.
5. **Landguth EL**, Holden Z, Mahalovich MF (*in prep*) Outplanting Whitebark Pine resistant genes for blister rust across the northern Rocky Mountains.

### **Research Grants (Post Graduate)**

**Funding to date: \$3,878,447**

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Project/Proposal Title:	Modeling the combined effects of landscape resistance and adaptive evolution on landscape genomics of Fremont cottonwood and southwestern white pine.
Source of Support:	USFS RJVA
Total Award/Budget:	\$260,000
Performance Period:	2015–2018
Project/Proposal Title:	A system to forecast the demographic and genetic viability of salmonid fish across broad regions under changing climates
Source of Support:	NASA ROSES A.36 Earth Science Applications: Ecological Forecasting
Total Award/Budget:	\$716,000 Phase II
Performance Period:	2015–2017
Project/Proposal Title:	Landscape genetics guide NTD interventions: Chagas disease in Ecuador and Peru
Source of Support:	NIH Academic Research Enhancement Award (R15)
Total Award/Budget:	\$426,721
Performance Period:	2015-2017
Project/Proposal Title:	A prototype system for predicting insect and climate-induced impacts on fire hazard in complex terrain
Source of Support:	NASA ROSES A.35 Earth Sciences Applications: Wildland Fires
Total Award/Budget:	\$1,300,000 Phase II
Performance Period:	2015-2017
Project/Proposal Title:	A system to forecast the demographic and genetic viability of salmonid fish across broad regions under changing climates

Source of Support: NASA ROSES A.36 Earth Science Applications: Ecological Forecasting  
Total Award/Budget: \$190,509 Phase I  
Performance Period: 2013–2014

Project/Proposal Title: Spring School 2014: A Practical, hands-on introduction to landscape genetics

Source of Support: Volkswagen Stiftung Foundation  
Total Award/Budget: \$40,000  
Performance Period: March 2014

Project/Proposal Title: Riverscape genetics of Westslope cutthroat in the Boundary System, Washington: simulation modeling of dam removal, reintroduction and sampling strategies

Source of Support: Seattle City Lights  
Total Award/Budget: \$196,264  
Performance Period: 2013–2015  
Amendment: \$190,000 (2016 – 2018)

Project/Proposal Title: A prototype system for predicting insect and climate-induced impacts on fire hazard in complex terrain

Source of Support: NASA ROSES A.35 Earth Sciences Applications: Wildland Fires  
Total Award/Budget: \$149,526 Phase I  
Performance Period: 2012-2013

Project/Proposal Title: The North Pacific Forest Landscape Corridor and Connectivity Project: Assessing landscape and species vulnerability.

Source of Support: USFWS NPLCC  
Total Award/Budget: \$41,243  
Performance Period: 2011–2012

Project/Proposal Title: A multi-scale approach for remotely mapping pine-beetle attacks over time and associated fire hazard.

Source of Support: USFS WWTAC  
Total Award/Budget: \$20,000  
Performance Period: 2011–2013

Project/Proposal Title: Developing methods for detecting ADS data using multi-temporal Landsat data.

Source of Support: USFS Cooperative Agreement  
Total Award/Budget: \$60,000  
Performance Period: 2010–2013

Project/Proposal Title: Prioritizing White bark pine genetic and restoration activities

Source of Support: USFS Cooperative Agreement  
Total Award/Budget: \$20,000  
Performance Period: 2010–2015

Project/Proposal Title: Predicting climate change impacts on river ecosystems and salmonids across the Pacific Northwest: Combining vulnerability modeling, landscape genomics, and economic evaluations for conservation

Source of Support: USGS Climate Science Center

Total Award/Budget: \$87,828

Performance Period: 2012-2014

Project/Proposal Title: Developing and applying an agent based model for adaptive evolution in complex and nonequilibrium environments

Source of Support: USFS RJVA

Total Award/Budget: \$129,250

Performance Period: 2010-2012

Project/Proposal Title: Conifer genomics and climate change

Source of Support: USFS RJVA

Total Award/Budget: \$14,150

Performance Period: 2010-2012

Project/Proposal Title: Effects of climate change on wildlife populations, habitat and connectivity in the Rocky Mountains

Source of Support: USFS RJVA

Total Award/Budget: \$66,686

Performance Period: 2010-2013

Project/Proposal Title: Modeling habitat connectivity for wildlife species across the Western United States under alternative future climate regimes

Source of Support: USFS RJVA

Total Award/Budget: \$167,455

Performance Period: 2010-2014

Project/Proposal Title: Developing and applying an agent-based gene flow model for salmonids in complex and nonequilibrium stream environments

Source of Support: USGS CESU

Total Award/Budget: \$22,815

Performance Period: 2011-2012

### Teaching Experiences

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(Spring 2016). *Instructor*. 'BIOL595: Landscape Genetics: developing best practices for testing landscape effects on gene flow' at University of Montana.

(March 2016). *Workshop*. An introduction to the landscape genetics approach, National Center Biological Sciences, Bangalore, India.

March 2014. *Workshop/Spring School*. A practical, hands-on introduction to landscape genetics, University of Göttingen, Germany.

Spring 2014. *Instructor*. 'BIOL595: Landscape Genetics: developing best practices for testing landscape effects on gene flow' at University of Montana.



- 2012 – 2013. *Affiliate Faculty*. Department of Fisheries & Wildlife, Oregon State University – Corvallis, OR. Committee Service and Advising: (PhD graduate student T Creech) on evaluating current and future genetic diversity and connectivity of desert bighorn sheep.
2012. *Instructor*. 'BIOL595: Landscape Genetics: developing best practices for testing landscape effects on gene flow' at University of Montana. Co-lead the online version of the course that was broadcasted across ~25 universities world-wide, and supervised three student projects (all of which are in preparation for publication currently).
- 2011 – . *Montana Institute on Ecosystems Faculty Fellow*. A recently developed Institute on interdisciplinary research and education across Montana's universities.
2011. *Workshop*. Simulation modeling in landscape genetics, Monash University, Australia.
2011. *Guest Lecturer*. Computational Biology, Montana Integrative Learning Experience for Students, University of Montana.
2010. *Research Assistant*. NCEAS Landscape Genetics DGS, University of California – Santa Barbara, CA. Co-developed and co-instructed for 'Landscape Genetics: developing best practices for testing landscape effects on gene flow', a NCEAS Distributed Graduate Seminar. This course was broadcasted across 8 universities world-wide and produced 5 student-lead publications in landscape genetics.
2009. *Co-instructor*. Co-developed 'BIOL495: Spatial epidemiology application in GIS' at the University of Montana through the NSF IGERT Montana-Ecology of Infectious Diseases program.
2009. *Workshop*. Simulation modeling in landscape genetics, CONGEN, University of Montana – Flathead Biological Station.
2009. *Guest Lecturer*. BIOL595: Advanced population genetics, Division of Biological Sciences, University of Montana.
2008. *Guest Lecturer*. CS577: Computer simulations, Computer Science Dept., University of Montana.
2007. *Guest Lecturer*. MATH414: Ordinary differential equations, Mathematics Dept., University of Montana.
- 2004 – 2013. *Tutor*. All levels of mathematics and currently involved with Frenchtown, Montana high school algebra students.
2004. *Teaching Assistant*. Institute of Atmospheric Science, SD School of Mines and Technology – Rapid City, SD. Designed GIS and IDL components for senior-level remote sensing courses (Remote Sensing of the Environment and Advanced GIS), as well as taught GIS workshops.
2000. *Teaching Assistant*. Mathematics Department, SD School of Mines and Technology.

### **Invited Seminar Presentations**

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2015. "Scape" genetics: application in rivers and disease ecology. Department of Biology Seminar Series, University of Missouri.
2015. An eco-evolutionary metapopulation simulation model for population viability analysis in riverscape demogenetics: Case examples in the Sullivan watershed, Washington, USA. IBEST Seminar Series, University of Idaho.
2015. An evolutionary demogenetics simulation framework: linking environmental effects to evolutionary processes through movement and natural selection. IALE 2015 Eco-evolutionary models Symposium, Portland Oregon.

- 2012. Simulating natural selection in landscape genetics: applications in conservation and speciation genetics. University of Toronto, Department of Ecology and Evolutionary Biology Seminar Series, Toronto, CA.
- 2011. Simulating natural selection in landscape genetics. University of Provence, Conversation Biology Department, Marseille, France.
- 2011. Simulation modelling in landscape genetics: on the need to go further. Talkfest-Keynote Speaker, Melbourne, AU.
- 2011. Simulating natural selection in landscape genetics. International Conference in Landscape Genetics, Bialowieza, Poland.
- 2010. Simulation Modeling in Landscape Genetics. University of Idaho, College of Natural Resources, Moscow Idaho.

### **Presentations at Scientific Conferences**

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- 2015. Using riverscape genetics as a model for reintroducing bull trout into the lower Pend Orielle river, [Meryl Mims](#), Erin Landguth, 2015 ScCS meeting, Yakima Washington.
- 2015. Using riverscape genetics as a model for reintroducing bull trout into the lower Pend Orielle river, [Meryl Mims](#), Erin Landguth, 2015 IALE Waterscape Genetics Symposium, Portland Oregon.
- 2014. Conservation Riverscape Genetics: A case example for westslope cutthroat trout in the Sullivan watershed, Washington, USA, [Erin Landguth](#), Andrew Bearlin, Western Division American Fisheries Society Meeting, Mazatlan, MX, April 2014.
- 2013. Combining demographic and genetic factors to map population vulnerability in stream species, [Erin Landguth](#), Clint Muhlfeld, et al., Western Division American Fisheries Society Meeting, Boise ID, April 2013.
- 2012. Landscape genetics and limiting factors, [Sam Cushman](#), Andrew Shirk, Erin Landguth, Ecological Society of America, Portland OR.
- 2012. New null models of isolation by distance needed for landscape genetics, [Tabitha Graves](#), Paul Beier, Jason Wilder, Erin Landguth, Montana chapter of the Wildlife Society, Great Falls MT, March 2012.
- 2012. New null models of isolation by distance needed for landscape genetics, [Tabitha Graves](#), Beier, Wilder, Landguth. Arizona and New Mexico chapters of the Wildlife Society, Phoenix AZ, January 2012.
- 2011. CDFISH: a simulator of population genetics and connectivity in complex riverscapes. [Erin Landguth](#), Clint Muhlfeld, Gordon Luikart, American Fisheries Meeting, September 2011.
- 2011. GARM: A Genetic Algorithm for Validation of Animal Movement Resistance Surfaces, [Brian Hand](#), Erin Landguth, Doug Raiford, International Congress for Conservation, Auckland, NZ, December 2011.

### **Service**

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- 2015. NSF DEB review panel.
- 2015. Co-Organizer International Association of Landscape Ecology Symposium, Incorporating Eco-Evolutionary Processes into Population Models.
- 2014. Editorial Board, Axios Review.
- 2014. Landscape genetics synthesis meeting, Coeur d'Alene, Idaho.
- 2013. Expert panel reviewer, National Institute of Health.
- 2013. Expert external reviewer, Netherlands Organisation for Scientific Research.
- 2012. Landscape genetics synthesis meeting, University of Toronto.

- 2010 – . Journal Referee: Molecular Ecology (“Top Reviewer for Molecular Ecology 2012”), Molecular Ecology Resources, Ecography, Methods in Ecology and Evolution, Heredity, Ecology and Evolution, Landscape Ecology, PLoS ONE, Journal of Marine Research, Oikos, Conservation Biology, and Proceedings of the Royal Society B, Bioinformatics, Conservation Genetics.
2010. Landscape genetics synthesis meeting, University of Santa Barbara.

### **Graduate Students**

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- Brian Hand PhD advisor, Systems Ecology, U. Montana. “Modeling Connectivity in Landscape Genetics: Applications, Optimization and assessing uncertainty.” Currently in a post-doc with G. Luikart, Flathead Lake Biological Station, University of Montana.
- Leslie Jones PhD advisor, Systems Ecology, University of Montana. “High-resolution geostatistical modelling of stream temperatures in complex riverscapes: Assessing aquatic species vulnerabilities under a changing climate”.
- Tyler Creech PhD committee, Wildlife Biology, Oregon State University. “Evaluating current and future genetic diversity and connectivity of desert bighorn sheep”.
- Annie Cooper PhD committee, Systems Ecology, University of Montana. “Carbon dynamics in Mountain Pine Beetle induced forests”.
- Lyric Yang MS committee, Mathematics, University of Montana. “Improvements to auto-logistic estimators and applications to Mountain Pine Beetle outbreaks.”
- Cody Palmer PhD committee, Mathematics, University of Montana. “Systems of equations for relapsing disease dynamics.”
- M. Oscarson MS committee, Environmental Sciences, Western Washington University. “Landscape genetics of mountain sheep.”
- K. Hatlestad MS committee, Anthropology, University of Montana. “Simulating socio-natural systems.”
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## References:

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### *Michael Schwartz*

Wildlife Ecology Research Unit  
Rocky Mountain Research Station  
800 E. Beckwith Ave.  
Missoula MT 59801  
Phone: 406.542.4161  
Fax: 406.543.2663  
E-mail: mkschwartz @ fs.fed.us

### *Bill Holben*

Professor  
Division of Biological Sciences  
Health Sciences 104  
The University of Montana  
32 Campus Drive #4824  
Missoula, MT 59812-1002  
Phone: 406.243.6163  
Fax: 406.243.4184  
Email: bill.holben@mso.umt.edu

### *Sam Cushman*

Research Ecologist  
Forest and Woodlands Ecosystems  
2500 S Pine Knoll Dr  
Flagstaff, AZ 86001  
Phone: 406.329.2133  
Cell: 406.241.6537  
Email: scushman@fs.fed.us

### *Emily Stone*

Professor  
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