

# Matthew W. Pennell

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## Education

Ph.D. Candidate, Bioinformatics and Computational Biology, University of Idaho, 2010-present.

*Dissertation:* Phylogenetic models of trait evolution.

*Major Supervisor:* L.J. Harmon

*Committee:* S.L. Nuismer, A.Ø. Mooers, J. Sullivan, P. Joyce

B.Sc. Honours, Biological Sciences, Simon Fraser University, 2010.

*Thesis Project:* Measuring the two-fold cost of sex in natural populations of *Timema* stick insects.

*Thesis Supervisor:* B.J. Crespi

## Research

### Publications

Pennell, M.W.\*, J.M. Eastman\*, G.J. Slater, J.W. Brown, J.C. Uyeda, R.G. FitzJohn, M.E. Alfaro, and L.J. Harmon. *in press*. geiger v2.0: an expanded suite of methods for fitting macroevolutionary models to phylogenetic trees. *Bioinformatics*.

FitzJohn, R.G.\*, M.W. Pennell\*, A.E. Zanne, P.F. Stevens, D.C. Tank, and W.K. Cornwell. *in press*. How much of the world is woody? *Journal of Ecology*.

Stansbury, C.R., D.E. Ausband, P. Zager, C.M. Mack, C.R. Miller, M.W. Pennell, and L.P. Waits. *in press*. A long term population monitoring approach for a wide-ranging carnivore: noninvasive genetic sampling of gray wolf rendezvous sites in Idaho, USA. *Journal of Wildlife Management*.

The Tree of Sex Consortium; T. Ashman, D. Bachtrog, H. Blackmon, E.E. Goldberg, M.W. Hahn, M. Kirkpatrick, J. Kitano, J.E. Mank, I. Mayrose, R. Ming, S.P. Otto, C.L. Peichel, M.W. Pennell, N. Perrin, L. Ross, N. Valenzuela, and J.C. Vamosi. 2014. Tree of Sex: a database of sexual systems. *Scientific Data* 1:140015.

R. Lanfear and M.W. Pennell. 2014. Open access is worth considering. *Trends in Plant Sciences* 19:340-341.

Pennell, M.W., L.J. Harmon, and J.C. Uyeda. 2014. Speciation unlikely to drive divergence rates. *Trends in Ecology & Evolution* 29:72-73.

Cornwell, W.K., M. Westoby, D.S. Falster, R.G. FitzJohn, B.C. O'Meara, M.W. Pennell, D.J. McGlinn, J.M. Eastman, A.T. Moles, P.B. Reich, D.C. Tank, I.J. Wright, L. Aarssen, J.M. Beaulieu, R.M. Kooyman, M.R. Leishman, E.T. Miller, U. Niinemets, J. Oleksyn, A. Ordóñez, D.L. Royer, S.A. Smith, P.F. Stevens, L. Warman, P. Wilf, and A.E. Zanne. 2014. Functional distinctiveness of major plant lineages. *Journal of Ecology* 102:345-356.

Slater, G.J. and M.W. Pennell. 2014. Robust regression and posterior predictive simulations increase power to detect early bursts of trait evolution. *Systematic Biology* 63:293-308.

Pennell, M.W., L.J. Harmon, and J.C. Uyeda. 2014. Is there room for punctuated equilibrium in macroevolution? *Trends in Ecology & Evolution* 29:23-32.

Pennell, M.W. and L.J. Harmon. 2013. An integrative view of phylogenetic comparative methods: connections to population genetics, community ecology and paleobiology. *Annals of the New York Academy of Sciences* 1289:90-105.

Maliska, M.E., M.W. Pennell, and B.J. Swalla. 2013. Developmental mode influences diversification in Ascidians. *Biology Letters* 9:20130068.

Stoltzfus, A., H. Lapp, N. Matasci, H. Deus, B. Sidlauskas, C.M. Zmasek, G. Vaidya, E. Pontelli, K. Cranston, R. Vos, C.O. Webb, L.J. Harmon, M. Pirrung, B. O'Meara, M.W. Pennell, S. Mirarab, M.S. Rosenberg, J.P. Balhoff, H.M. Bik, T.A. Heath, P.E. Midford, J.W. Brown, E.J. McTavish, J. Sukumaran, M. Westneat, M.E. Alfaro, A. Steele, and G. Jordan. 2013. Phylotastic! Making tree-of-life knowledge accessible, reusable and convenient. *BMC Bioinformatics* 14:158

Pennell, M.W., C.R. Stansbury, L.P. Waits, and C.R. Miller. 2013. Capwire: a R package for estimating population census size from non-invasive genetic sampling. *Molecular Ecology Resources* 13:154-157.

Pennell, M.W., B.A.J. Sarver, and L.J. Harmon. 2012. Trees of unusual size: biased inference of early bursts from large molecular phylogenies. *PLoS ONE* 7:e43348.

Pennell, M.W. 2012. Biology in the light of phylogeny. *Trends in Ecology & Evolution* 27:657-658.

Rosenblum, E.B., B.A.J. Sarver, J.W. Brown, S. Des Roches, K. Hardwick, T.D. Hether, J.M. Eastman, M.W. Pennell, and L.J. Harmon. 2012. Goldilocks meets Santa Rosalina: an ephemeral speciation model explains patterns of diversification across time scales. *Evolutionary Biology* 39:255-261.

Green, D.J., K.B. Loukes, M.W. Pennell, J. Jarvis, and W.E. Easton. 2012. Reservoir levels do not influence daily mass gain of warblers at a riparian stopover site. *Journal of Field Ornithology* 82:11-24.

\*Denotes equal contribution

### *Papers Under Review or Revision*

Pennell, M.W., R.G. FitzJohn, W.K. Cornwell, and L.J. Harmon. Model adequacy and the macroevolution of angiosperm functional traits. *In review at The American Naturalist*.

Sarver, B.A.J., M.W. Pennell, J.W. Brown, K.M. Hardwick, J. Sullivan, and L.J. Harmon. The choice of tree prior and molecular clock does not substantially affect phylogenetic inferences of diversification rates. *In review at Systematic Biology*.

Uyeda, J.C., D.S. Caetano, and M.W. Pennell. Statistical and conceptual challenges in the comparative analysis of principal components. *In review at Systematic Biology*.

### *Additional writings*

Essay inducting Joseph Felsenstein as a Honorary Lifetime Member of the American Society of Naturalists (co-authored with J.B. Losos and S.P. Otto)

## **Additional research experience**

### *Collaborative research initiatives*

Member of *Tree of Sex* Consortium

Member of *Tempo and Mode of Angiosperm Trait Evolution* Working Group

Participant in the *Phylotastic* Hackathon, National Evolutionary Synthesis Center

Participant in the *SimBank* Catalysis Meeting, National Evolutionary Synthesis Center

### *Undergraduate research experience*

Research Assistant, Simon Fraser University, Supervised by D.J. Green. May-August 2010, Project title: Latitudinal Differences in Carry-Over Effects in Yellow Warblers.

Field Assistant/NSERC-USRA Researcher, Supervised by D.J. Green. May-July 2009, Project title: Impacts of Brown Headed Cowbird Parasitism on Yellow Warblers.

BISC 498: Undergraduate Research, Supervised by J.K. Christians. May-August 2008, Project title: Investigation of a QTL candidate (*PAPPA2*) for skeletal development in mice.

## Scientific software

**arbutus**: R package for assessing the adequacy of phylogenetic models of trait evolution.  
<http://github.com/mwpennell/arbutus>

**geiger**: R package for fitting macroevolutionary models to phylogenetic trees.  
<http://github.com/mwpennell/geiger-v2>

**capwire**: R package for estimating population census size from non-invasive genetic sampling.  
<http://github.com/mwpennell/capwire>

## Presentations

### *Invited seminars*

The adequacy of phylogenetic trait models. *Evolution* 2014. Society for Systematic Biologists Symposium: *The Dark Side of Phylogenetic Comparative Methods*. Durham, NC, June 2014

Progressive radiations and the pulse of angiosperm diversification. Department of Biology, University of Virginia. Charlottesville, VA, October 2012

### *Contributed talks and posters*

The adequacy of phylogenetic trait models

Evolution meeting, Snowbird, UT, June 2013

Palouse Evolution and Ecology Society, Pullman, WA, December 2013

Evo-WIBO Conference, Port Townsend, WA, April 2014

Progressive radiations and the pulse of angiosperm diversification

Evo-WIBO Conference, Port Townsend, WA, April 2012\*\*\*Best Poster Award

## Outreach

Co-organizer, *Workflows for Reproducible Science* Hackathon and Workshops, Durham, NC, May 2014-present

Lecturer, *Applied phylogenetics* workshop, Quito, Ecuador, Aug 2013

Lecturer, *Evolutionary Quantitative Genetics* NESCent academy course, Durham, NC, Aug 2012

Lecturer, *Macroevolution in R* workshop, Santa Barbara, CA, June 2012

## Teaching

### *University of Idaho*

Teaching assistant and part-time lecturer, BCB 504 Applied Bioinformatics, Spring 2012

### *Simon Fraser University*

Teaching Assistant, BISC 300 Evolution, Fall 2009

Teaching Assistant, BISC 302 Genetic Analysis, Fall 2008

Teaching Assistant, BISC 300 Evolution, Summer 2008

Teaching Assistant, BISC 102 Introduction to Ecology and Evolution, Spring 2008

## Grants, Fellowships, & Awards

NSERC (Canada) Post-graduate research fellowship, 2013  
Bioinformatics and Computational Biology Graduate Fellowship, University of Idaho, 2013 (declined)  
Bioinformatics and Computational Biology Graduate Fellowship, University of Idaho, 2012  
Rosemary Grant Graduate Student Research Award, Society for the Study of Evolution, 2012  
Graduate Fellowship, National Evolutionary Synthesis Center (NESCent), 2012  
Best Poster, Evo-WIBO conference, 2012  
Research Assistantship, BEACON center for Evolution in Action (with J. Felsenstein and L.J. Harmon), 2012  
Honours with great distinction, Simon Fraser University, 2010  
NSERC (Canada) Alexander Graham Bell Graduate fellowship, 2010 (declined)  
NSERC (Canada) Post-graduate research fellowship, 2010  
Vice President of Research, Undergraduate Student Research Award, Simon Fraser University, 2010  
SFU Open Scholarship (x2), 2009  
NSERC Undergraduate Student Research Award, 2009  
Gordon Shrum Entrance Scholarship, Simon Fraser University, 2005

## Professional Activities

Reviewer for *Proceedings of the National Academy of Sciences*, *Systematic Biology*, *Evolution*, *Proceedings of the Royal Society: B*, *Journal of Evolutionary Biology*, *Ecology*, *Methods in Ecology & Evolution*, *PLoS ONE*, *Functional Ecology*, *The ISME Journal*, *Molecular Ecology Resources*, and *New Phytologist*  
Rosemary Grant Student Research Award Committee, American Society of Naturalists, 2013-2014  
Graduate Committee to the Executive Council, American Society of Naturalists, 2012-Present  
Graduate Representative to the Executive Council, American Society of Naturalists. 2013-2014  
Member, American Society of Naturalists, 2012-Present  
Member, Society for the Study of Evolution, 2012-Present

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