

Curriculum Vitae
CATHERINE RAMSAY LINNEN

Address:

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Current Position:

2011- Assistant Professor
 Department of Biology, University of Kentucky

Previous Positions:

2010-2011 Research Associate
 Department of Organismic & Evolutionary Biology, Harvard University
 PI: Dr. Hopi Hoekstra
2007-2010 Ruth L. Kirschstein NIH–NRSA Postdoctoral Fellow
 Department of Organismic & Evolutionary Biology, Harvard University
 PI: Dr. Hopi Hoekstra

Education:

2000-2007 Ph.D. in Organismic and Evolutionary Biology
 Harvard University; Advisor: Dr. Brian Farrell
1996-2000 B.S. in Ecology (*Summa Cum Laude*, Highest Honors, GPA: 4.0)
 University of Georgia; Advisors: Dr. Mark Hunter and Dr. Daniel Promislow

Research Interests:

Genetics of adaptation and speciation
Molecular basis of morphological change
Speciation ecology and biogeography
Phylogenomics and comparative methods
Ecological and population genomics

Grants:

- 2013-2016 National Science Foundation, “Comparative analysis of host-shift speciation in the redheaded pine sawfly, *Neodiprion lecontei* (Hymenoptera: Diprionidae)” (PI); \$600,000
- 2014 National Science Foundation REU supplement to: “Comparative analysis of host-shift speciation in the redheaded pine sawfly, *Neodiprion lecontei* (Hymenoptera: Diprionidae)” (PI); \$7,764
- 2010 Postdoctoral Researcher Travel Award, Society of Molecular Biology and Evolution; \$1,500
- 2003-2004 National Science Foundation, “Dissertation Research: Phylogenesis of hostshifts and specialization in *Neodiprion* sawflies” (PI; Co-PI B. Farrell); \$10,570
- 2004 Museum of Comparative Zoology Putnam Expedition Grant, Harvard University; \$3,056
- 2003 American Museum of Natural History Theodore Roosevelt Memorial Grant; \$1,241
- 2003 Museum of Comparative Zoology Putnam Expedition Grant, Harvard University; \$3,687
- 2002 Museum of Comparative Zoology Putnam Expedition Grant, Harvard University; \$2,500
- 2002 American Museum of Natural History Theodore Roosevelt Memorial Grant; \$1,800
- 2002 Museum of Comparative Zoology Putnam Expedition Grant, Harvard University; \$2,748
- 2001 Museum of Comparative Zoology Putnam Expedition Grant, Harvard University; \$1,500

Fellowships:

- 2007-2010 National Institutes of Health Ruth L. Kirschstein National Research Service Award (NRSA) Postdoctoral Fellowship
- 2004-2007 Environmental Protection Agency Science to Achieve Results (STAR) Graduate Fellowship
- 2004 Graduate School of Arts and Sciences Merit Fellowship (John Parker Scholarship), Harvard University
- 2000-2004 National Science Foundation Graduate Research Fellowship
- 1998 Howard Hughes Fellowship for Undergraduate Research

Honors and Awards:

- 2013 GenomeWeb Eighth Annual Young Investigator
- 2012 Invitation to Japanese-American Kavli Frontiers in Science symposium
- 2006 Ernst Mayr Award; Society of Systematic Biologists
- 2003 President’s Prize (Honorable Mention); Entomological Society of America
- 2001 Derek Bok Award for Excellence in Teaching, Harvard University
- 2000 Derek Bok Award for Excellence in Teaching, Harvard University
- 2000 Josh Laerm Memorial Outstanding Ecology Undergraduate Award, Institute of Ecology, University of Georgia
- 2000 First Honor Graduate (4.0 GPA), University of Georgia
- 2000 Phi Beta Kappa Honor Society, University of Georgia

Student Grants and Awards (*undergraduate):

2014	Robin Bagley, USDA-NIFA Predoctoral Fellowship, \$73,805
2014	*Alonna Ballinger, Ribble Undergraduate Summer Research Internship, \$5000
2013	Kim Duong, University of Kentucky Graduate Travel Award, \$400
2013	Kim Duong, University of Kentucky Ribble Mini-Grant, \$500
2013	Robin Bagley, University of Kentucky Ribble Mini-Grant, \$500
2013	*Taylor Shackelford, Ribble Undergraduate Summer Research Internship, \$5000
2013	*Taylor Shackelford, Summer Research and Creativity Fellowship, \$2000
2013	*Mary Collins, Summer Research and Creativity Fellowship, \$2000
2013	Kim Duong, Arthropod Genomics Symposium Travel Grant, \$558
2013	John Terbot, Academic Year Fellowship
2013	John Terbot, Daniel R. Reedy Quality Achievement Award
2013	Kim Duong, Lyman T. Johnson Award
2013	*Mary Collins, Gertrude Flora Ribble Undergraduate Research Scholarship, \$1500
2013	Kim Duong, NSF Graduate Research Fellowship Honorable Mention
2012	*Taylor Shackelford, Honors Program Independent Research Grant, \$500
2012	Robin Bagley, University of Kentucky Ribble Mini-Grant, \$500
2012	Robin Bagley, Society for the Study of Evolution Travel Award, \$500
2012	Robin Bagley, Canadian Society for the Study of Evolution Travel Award, \$500
2012	Robin Bagley, NSF Graduate Research Fellowship Honorable Mention
2011	Robin Bagley, NSF Graduate Research Fellowship Honorable Mention
2011	Robin Bagley, Daniel R. Reedy Quality Achievement Award
2011	Robin Bagley, Gertrude Flora Ribble Research Fellowship
2011	Robin Bagley, Multi-Year Fellowship

Teaching Experience:

2014 (F)	BIO770: Graduate Seminar in Convergent Evolution, 12 students
2014 (S)	BIO621: Ecological Genetics, Kentucky, 15 students
2013 (F)	BIO425: Origins of Biodiversity Seminar, Kentucky, 13 students
2013 (S)	BIO303: Introduction to Evolution, Kentucky, 68 students
2012 (F)	BIO770: Graduate Seminar in Adaptation and Speciation, Kentucky, 13 students
2006 (Su)	Teaching Assistant, General Biology, Harvard University Summer School
2006 (S)	Teaching Assistant, General Biology, Harvard University Extension School
2005 (F)	Teaching Assistant, General Biology, Harvard University Extension School
2005 (Su)	Teaching Assistant, General Biology, Harvard University Summer School
2002 (F)	Teaching Assistant, Animal Behavior, Harvard University
2001 (S)	Teaching Assistant, Ecology, Harvard University
2000 (F)	Teaching Assistant, Organismal Biology, Harvard University

Outreach Activities:

Participant in Science Careers Seminar Series, Georgetown University, 2014 (scheduled)
 Lab tour for Henry County Middle School tour of Biology labs, 2013
 Participant in Science Careers Seminar Series, Georgetown University, 2011
 Teaching assistant for the Life Sciences-HHMI High School Outreach Program, 2003-2008
 Cape Cod Evaluation Bioblitz volunteer (E. O. Wilson Biodiversity Foundation), 2006
 Mentor for undergraduate women in science, Harvard University, 2005-2006
 Teaching assistant for Harvard ExperiMentors' Day, 2004-2006

Professional Service:

Peer reviewer for: *Evolution, Molecular Ecology, Molecular Biology and Evolution, Philosophical Transactions of the Royal Society, Systematic Biology, Molecular Phylogenetics and Evolution, Proceedings of the Royal Society B: Biological Sciences, PLoS ONE, Heredity, Ecology Letters, Nature Communications*
Abstract reviewer for the National Conference on Undergraduate Research, December 2013
Society for the Study of Evolution, Hamilton Award Judge, June 2013 and June 2014
Editorial Board, *Systematic Biology*, 2010-2013
NSF, ad hoc reviewer for Evolutionary Genetics Program, September 2014.
NSF, ad hoc reviewer for Evolutionary Genetics Program, August 2013.
NSF, Dissertation Improvement Grant (Evolutionary Processes) review panel, February 2013.
Society of Systematic Biologists, Graduate Student Research Awards reviewer, April 2012.
NSF, ad hoc reviewer for Phylogenetic Systematics Program, September 2011.

University Service and Student Supervision, University of Kentucky:

Graduate Affairs Committee, 2013-2015
Search Committee, Computational/Mathematical Biology, 2013-2014
Seminar Committee, 2012-2015
Graduate Affairs Committee, 2012-2013
Search Committee, Integrative Biology, 2011-2012
Host to three seminar speakers and one faculty candidate
Organized R workshop for Biology faculty and students (workshop led by Dr. Katherine Thompson, Dept. of Stastics)

Postdoctoral Scholars:

Dr. Claire O'Quin (August 2014-present)
Dr. Matthew Niemiller (2013-2014)

Primary PhD advisor for:

Robin Bagley (2011-present)
Kim Duong (2012-present)
John Terbot (2013-present)
Emily Bendall (2014-present)

Visiting Scholars:

Dr. Carita Lindstedt, visiting postdoctoral scholar, September 2013

Undergraduate students (Univeristy of Kentucky):

Taylor Shackelford (2011-2013; BIO 199, BIO 395, summer research fellowship)
Mary Collins (2012-2013; BIO 395, summer research fellowship)
Kyle Schwachter (2011-2012; work study)
Melanie Hurst (2013-present; paid employee, REU fellowship, BIO 395)
Meghan Pasquale (Spring 2013; paid employee)
Katherine Harper (Summer 2013-present; paid employee, BIO 395, lab manager)
Alonna Ballinger (Fall 2013-Summer 2014; paid employee, summer research fellowship)
Ahmad Nawaz (Fall 2013 and Spring 2014; work study)
Ethan Adams (Spring 2014-present; BIO 395)
Ismaeel Siddiqi (Spring 2014 and Summer 2014; BIO 395, paid employee)
Jeremy Frederick (Spring 2014-present; BIO 395)

Jordan Wolfe (Spring 2014-present; BIO 395)
Natascha Richardson (Spring 2014; BIO 199)
Layne Gaynor (Spring 2014-present; BIO 199, BIO 395)
Connor Sears (Fall 2014-present; BIO 395)

Additional mentees (outside of University of Kentucky):

Kathryn DeVeau (Fall 2011-Spring 2012; paid employee; Georgetown University)
Rachael Ziembroski (Summer 2012; paid employee; University of Rochester)
Aubrey Mojesky (Summer 2013; paid employee; Centre College)
Emily Stromberg (Summer 2013; KBRIN student)
MacKenzie Taylor (Summer 2014; NSF-REU student)

Student committees:

Erika Tucker (PhD, Entomology)
Abiya Saeed (MS, Entomology)
Paul Hime (PhD, Biology)
Scott Hotaling (PhD, Biology)
Justin Kratovil (PhD, Biology)
Tian Li (PhD, Entomology)
Jacqueline Dillard (PhD, Biology)
Victoria Pook (PhD, Entomology)
Schyler Nunziata (PhD, Biology)

Publications (*selected by Faculty of 1000; †authors contributed equally):

- Brady, C.M., M.K. Asplen, N. Desneux, G.E. Heimpel, K.R. Hopper, **C.R. Linnen**, K.M. Oliver, J.A. Wulff, and J.A. White. 2014. Worldwide populations of the aphid *Aphis craccivora* are infected with diverse facultative bacterial symbionts. *Microbial Ecology* 67: 195-204.
- Thompson, K.L., R. Charnigo, and **C.R. Linnen**. 2013. Using ancestral information to inform analyses of complex data sets. *Journal of Biometrics and Biostatistics*. 4: e126. (invited commentary)
- ***Linnen, C.R.**, Y.-P. Poh, B.K. Peterson, R.D.H. Barrett, J. G. Larson, J. Jensen, and H.E. Hoekstra. 2013. Adaptive evolution of multiple traits through multiple mutations at a single gene. *Science* 339: 1312-1316.
- Linnen, C.R.** and D.R. Smith. 2012. Recognition of two additional pine-feeding *Neodiprion* species (Hymenoptera: Diprionidae) in the eastern United States. *Proceedings of the Entomological Society of Washington*. 114: 492-500.
- Linnen, C.R.** 2010. Species-tree estimation for complex divergence histories: a case study in *Neodiprion* sawflies. In *Estimating species trees: in practice and theory* (L.L. Knowles and L.S. Kubatko, eds.). Wiley-Blackwell, Hoboken, NJ. (invited contribution).
- Linnen, C.R.** and B.D. Farrell. 2010. A test of the sympatric host race formation hypothesis in *Neodiprion* (Hymenoptera: Diprionidae). *Proceedings of the Royal Society of London B*. 277: 3131-3138.
- Manceau, M. †, V.S. Domingues†, **C.R. Linnen**†, E.B. Rosenblum and H.E. Hoekstra. 2010. Convergence in pigmentation at multiple levels: mutation, genes, and function. *Philosophical Transactions of the Royal Society B* 365: 2439-2450.
- Weber, J.N., M.B. Peters, O.V. Tsyusko, **C.R. Linnen**, C. Hagen, N.A. Schable, T.D. Tuberville, A.M. McKee, S.L. Lance, K.L. Jones, H.S. Fisher, M.J. Dewey, H.E. Hoekstra and T.C. Glenn. 2010. Five hundred microsatellite loci for *Peromyscus*. *Conservation Genetics*. 11: 1243-1246.
- Linnen, C.R.** and H.E. Hoekstra. 2009. Measuring natural selection on genotypes and phenotypes in the wild. *Cold Spring Harbor Symposia on Quantitative Biology* 74:155-168.
- ***Linnen, C.R.**, E.P. Kingsley, J.D. Jensen and H.E. Hoekstra. 2009. On the origin and spread of an

- adaptive allele in deer mice. *Science* 325(5944): 1095-1098.
- Linnen, C.R.** and B.D. Farrell. 2008. Phylogenetic analysis of nuclear and mitochondrial genes reveals mitochondrial introgression and evolutionary relationships in the *Sertifer* species group of *Neodiprion* (Hymenoptera: Diprionidae). *Molecular Phylogenetics and Evolution* 48: 240-257.
- Linnen, C.R.** and B.D. Farrell. 2008. Comparison of methods for species-tree inference in the sawfly genus *Neodiprion* (Hymenoptera: Diprionidae). *Systematic Biology* 57: 876-890.
- Linnen, C.R.** and B.D. Farrell. 2007. Mito-nuclear discordance is caused by rampant mitochondrial introgression in *Neodiprion* (Hymenoptera: Diprionidae) sawflies. *Evolution* 61(6): 1417-1438.
- Hunter, M.D., **C.R. Linnen** and B.C. Reynolds. 2003. Effects of endemic densities of canopy herbivores on soil processes along a gradient in elevation in the southern Appalachians. *Pedobiologia* 47(3): 231-244.
- Linnen, C.R.**, M. Tatar and D.E.L. Promislow. 2001. Cultural artifacts: A comparison of senescence in natural, laboratory, and artificially selected lines of *Drosophila melanogaster*. *Evolutionary Ecology Research* 3: 877-888.

Invited Presentations:

- 2015 Pan-American Society for Evolutionary Developmental Biology, Berkeley, CA (scheduled Fall 2015)
- 2014 Science Careers Seminar, Georgetown College, Science Division (scheduled Fall 2014)
- 2014 12th annual Ecological Genomics Symposium, Kansas City, MO (scheduled Fall 2014)
- 2014 “Ecological Genomics” Symposium, Plant and Animal Genome Conference, San Diego, CA
- 2013 University of Kentucky, Department of Forestry
- 2013 Centre College, Department of Biology
- 2013 University of Kentucky, Department of Entomology
- 2012 University of Cincinnati, Department of Biological Sciences
- 2012 American Society of Naturalists Vice-Presidential Symposium: “Natural selection in the wild: from genotype to phenotype”, Evolution Meeting, Ottawa, Ontario
- 2012 Georgia Institute of Technology, School of Biology
- 2011 University of Memphis, Department of Biological Sciences
- 2011 Science Careers Seminar, Georgetown College, Science Division
- 2011 University of Georgia, Department of Genetics
- 2010 University of Massachusetts Medical School, Program in Bioinformatics & Integrative Biology
- 2010 “Population Genomics of Adaptive Alleles” Symposium, Society for Molecular Biology and Evolution Meeting, Lyon, France
- 2010 “The Genetics and Evolution of Animal Coloration” Symposium, Radcliffe Institute for Advanced Study, Cambridge, MA
- 2010 University of Pennsylvania, Department of Biology
- 2010 Boston University, Department of Biology
- 2010 University of Kentucky, Department of Biology
- 2009 “Estimating Species Trees: A Phylogenetic Paradigm for the 21st Century” Workshop, University of Michigan, Ann Arbor, MI
- 2005 University of Massachusetts Amherst, Department of Entomology
- 2000 “Frontiers in Aging in a New Millenium” Symposium, 11th Annual Student Convention in Gerontology and Geriatrics, Columbus, GA

Oral presentations at meetings (*graduate student; **undergraduate student; ***postdoc):

- 2014 *Evolution meeting (Raleigh, NC) “Comparative analysis of preference and performance

- genes in the evolution of host specialization in *Neodiprion* sawflies” *Kim Duong and Catherine Linnen) (scheduled June 2014)
- 2014 ***Evolution meeting (Raleigh, NC) “Using full-genome sequencing to infer the species tree in *Neodiprion* sawflies (Hymenoptera: Diprionidae)” ***Matthew Niemiller, *Kim Duong, and Catherine Linnen) (scheduled June 2014)
- 2014 *Midwestern Ecology & Evolution Meeting (Dayton, OH) “Comparative study of the genetics of host-plant specialization across the *Neodiprion* genus” (*Kim Duong and Catherine R. Linnen)
- 2014 *Midwestern Ecology & Evolution Meeting (Dayton, OH) “Contributions of ecology and geography to genetic differentiation among populations of the red-headed pine sawfly, *Neodiprion lecontei*” (*Robin K. Bagley, Matt L. Niemiller, and Catherine R. Linnen)
- 2013 Evolution meeting (Snowbird, UT) “The genetics of adaptation: Comparing genotypic and phenotypic clines in cryptic deer mice”
- 2012 *Evolution Meeting (Ottawa, ON) “Host-shift speciation in *Neodiprion* sawflies: Preliminary evidence based on host-associated ecological and genetic divergence.” (*Robin K. Bagley and Catherine R. Linnen)
- 2008 Evolution meeting (Minneapolis, MN) “Molecular basis of adaptation: Cryptic color of deer mice living on the Nebraska Sand Hills.”
- 2006 EPA STAR Fellows Conference (Washington, D.C.) “Dueling datasets: Why do mitochondrial and nuclear gene trees disagree on *Neodiprion* phylogeny?” (poster)
- 2006 Genetics of Speciation meeting (Vancouver, BC) “Dueling datasets: Why do mitochondrial and nuclear gene trees disagree on *Neodiprion* phylogeny?” (poster)
- 2006 Evolution meeting (Stonybrook, NY) “Dueling datasets: Why do mitochondrial and nuclear gene trees disagree on *Neodiprion* phylogeny?”
- 2005 Evolution meeting (Fairbanks, AK) “How do *Neodiprion* sawflies speciate?”
- 2004 Evolution meeting (Fort Collins, CO) “The role of host shifts and specialization in the speciation of *Neodiprion* sawflies”
- 2003 Entomological Society of America meeting (Cincinnati, OH) “The role of host shifts and specialization in the speciation of *Neodiprion* sawflies”
- 1999 Southeastern Population Ecology and Genetics Group (Mountain Lake, VA) “Effects of laboratory culture on aging patterns in *Drosophila melanogaster*”

Poster presentations at meetings (*graduate student; **undergraduate student; *postdoc):**

- 2014 **Evolution meeting (Raleigh, NC) “A test of inbreeding avoidance in multiple populations of the redheaded pine sawfly, *Neodiprion lecontei*” (**Katherine Harper, *Robin Bagley, and Catherine Linnen) (scheduled June 2014)
- 2014 **National Conference on Undergraduate Research (Lexington, KY). “Genetic basis of color variation in sawflies” (**Taylor Shackelford and Catherine Linnen).
- 2014 **National Conference on Undergraduate Research (Lexington, KY). “Evidence of specialization in two populations of the redheaded pine sawfly, *Neodiprion lecontei*” (**Mary Collins, *Robin Bagley, and Catherine Linnen).
- 2014 *Midwestern Ecology & Evolution Meeting (Dayton, OH) “A quantitative assay for gregariousness to study the evolution of social behavior in pine sawflies” (*John Terbot and Catherine R. Linnen)
- 2013 **Showcase of undergraduate scholars, University of Kentucky. “Genetic basis of color variation in sawflies” (**Taylor Shackelford and Catherine Linnen).
- 2013 *Arthropod Genomics Symposium (Southbend, IN) “Chemosensory genes in the draft genome of a generalized specialist, the redheaded pine sawfly (*Neodiprion lecontei*)” (*Kim Duong, Adam Leonberger, *Robin K. Bagley, Catherine R. Linnen)
- 2013 *Evolution meeting (Snowbird, UT) “Chemosensory genes in the draft genome of a generalized

- specialist, the redheaded pine sawfly (*Neodiprion lecontei*)” (*Kim Duong, Adam Leonberger, *Robin K. Bagley, Catherine R. Linnen)
- 2013 *Evolution meeting (Snowbird, UT) “Host shift speciation in *Neodiprion* sawflies: Preliminary evidence based on host-associated ecological and genetic divergence” (*Robin K. Bagley, Catherine R. Linnen)
- 2013 **Evolution meeting (Snowbird, UT) “The genetic and environmental contributions to oviposition choice in the redheaded pine sawfly *Neodiprion lecontei*” (**Mary Collins, *Robin K. Bagley, Catherine R. Linnen)

Popular Press (selected):

- “A colorful way to watch evolution in Nebraska’s sand dunes.” New York Times, August 2011.
- “Mouse set to be an ‘evolution icon’.” by M. Walker. BBC News, August 2009.
- “Newly evolved fur coat a quick hit in Nebraska.” by M. Marshall. New Scientist, August 2009.
- “From mousy to blonde -- in 8,000 years.” Telegraph.co.uk, August 2009.
- “Survival of the blondest: Mice change their coat colour over 8,000 years to fool predators.” Daily Mail Online, August 2009.
- “Fast-track evolution gave rise to deer mouse’s pale coat.” Discover Magazine Blogs, August 2009.