

RYAN R. BRACEWELL



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CURRENT APPOINTMENT

Postdoctoral Researcher. University of California, Berkeley
Advisor: Dr. Doris Bachtrog

2021-present

EDUCATION

- PhD: Forestry and Conservation Sciences, University of Montana, Missoula, MT 2015
Advisors: Dr. Diana Six and Dr. Jeffrey Good
- MS: Ecology, Utah State University, Logan, UT 2009
Advisors: Dr. Barbara Bentz and Dr. Karen Mock
- BS: Bioagricultural Sciences and Pest Management: Concentration Entomology 2002
Colorado State University, Ft. Collins, CO

PROFESSIONAL APPOINTMENTS/EMPLOYMENT

- Entomologist. USDA Forest Service, Forest Health Protection. Boise, ID. 2020-2021
- Postdoctoral Researcher/NIH NRSA Postdoctoral Fellow. University of California, Berkeley 2016-20
Advisor: Dr. Doris Bachtrog

PUBLICATIONS

- 16) Bracewell, R. and D. Bachtrog. 2020. Complex evolutionary history of the Y chromosome in flies of the *Drosophila obscura* species group. **Genome Biology and Evolution**. 12:494-505.
- 15) Bracewell, R., A. Tran*, K. Chatla, and D. Bachtrog. 2020. Chromosome-level assembly of *Drosophila bifasciata* reveals important karyotypic transition of the X chromosome. **G3: Genes, Genomes, Genetics**. 10:891-897.
- 14) Bachtrog, D., S. Mahajan, and R. Bracewell. 2019. Massive gene amplification on a recently formed *Drosophila* Y chromosome. **Nature Ecology & Evolution**. 3:1587-1597.
- 13) Bracewell, R., K. Chatla, M.J. Nalley, and D. Bachtrog. 2019. Dynamic turnover of centromeres drives karyotype evolution in *Drosophila*. **eLife**. 8:e49002.
- 12) Bracewell, R.R., D. Vanderpool, J.M. Good, and D.L. Six. 2018. Cascading speciation among mutualists and antagonists in a tree-beetle-fungi interaction. **Proceedings of the Royal Society B**. 285:20180694.
- 11) Vanderpool, D., R.R. Bracewell, and J.P. McCutcheon. 2018. Know your farmer: ancient origins and multiple independent domestications of ambrosia beetle fungal cultivars. **Molecular Ecology**. 27:2077-2094.
- 10) Dowle, E., R.R. Bracewell, M.E. Pfrender, K.E. Mock, B.J. Bentz, and G.J. Ragland. 2017. Reproductive isolation and environmental adaptation shape the phylogeography of the mountain pine beetle (*Dendroctonus ponderosae*). **Molecular Ecology**. 26:6071-6084.
- 9) Bracewell, R.R., B.J. Bentz, B.T. Sullivan, and J.M. Good. 2017. Rapid neo-sex chromosome evolution and incipient speciation in a major forest pest. **Nature Communications**. 8:1593.
- 8) Wong Miller, K.M., R.R. Bracewell, M.B. Eisen, and D. Bachtrog. 2017. Patterns of genome-wide diversity and population structure in the *Drosophila athabasca* species complex. **Molecular Biology and Evolution**. 38:1912-1923.

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- 7) Bracewell, R.R., and D.L. Six. 2015. Experimental evidence of bark beetle adaptation to a fungal symbiont. **Ecology and Evolution**. 21:5109-5119.
- 6) Dytthe, J.C.*, R.R. Bracewell, and D.L. Six. 2015. Temperature effects on growth of fungal symbionts of the western pine beetle, *Dendroctonus brevicomis*. **Fungal Ecology**. 17:62-68.
- 5) D.L. Six and R.R. Bracewell. 2015. *Dendroctonus*. Pp. 305-350 in F.E. Vega and R.W. Hofstetter eds. **Bark beetles: Biology and Ecology of Native and Invasive Species**. Academic Press, San Diego, CA.
- 4) Bracewell, R.R., and D.L. Six. 2014. Broadscale specificity in a bark beetle-fungal symbiosis: A spatio-temporal analysis of the mycangial fungi of the western pine beetle. **Microbial Ecology**. 68:859-870.
- 3) Bracewell, R.R., M.E. Pfrender, K.E. Mock, and B.J. Bentz. 2013. Contrasting geographic patterns of genetic differentiation in body size and development time with reproductive isolation in *Dendroctonus ponderosae* (Coleoptera: Curculionidae, Scolytinae). **Annals of the Entomological Society of America**. 106:385-391.
- 2) Bentz, B. J., R.R. Bracewell, K.E. Mock, and M.E. Pfrender. 2011. Genetic architecture and phenotypic plasticity of thermally-regulated traits in an eruptive species, *Dendroctonus ponderosae*. **Evolutionary Ecology**. 25:1269-1288.
- 1) Bracewell, R.R., M.E Pfrender, K.E. Mock, and B.J. Bentz. 2011. Cryptic postzygotic isolation in an eruptive species of bark beetle (*Dendroctonus ponderosae*). **Evolution**. 65:961-975.

IN PREPERATION

Bracewell, R.R., K.M. Wong Miller, M.J. Nalley, and D. Bachtrog. The genomic landscape of incipient species reveals a candidate behavioral isolation gene in *Drosophila athabasca*.

*indicates undergraduate advisee

AWARDS AND GRANTS

NIH NRSA F32 Fellowship. Characterizing the phenotypic and genetic basis of behavioral isolation in the <i>Drosophila athabasca</i> species complex. (\$115,000)	2017-18
DECS Graduate Student Excellence Award. University of Montana.	2015
American Genetic Association travel award.	2015
Entomological Society of America Presidents Prize Winner for oral presentation.	2014
USDA AFRI NIFA Grant. Integrating population genetics and genomics in a beetle-fungal symbiosis. (\$77,300)	2013-16
Bertha Morton Scholarship. University of Montana. (\$3,000)	2013
Western Forest Insect Work Conference Memorial Scholarship. (\$750)	2012
George E. Bright Memorial Fellowship. University of Montana. (\$2,500)	2012
Entomological Society of America, Systematics, Evolution and Biodiversity (SysEB) travel award.	2011
George E. Bright Memorial Fellowship. University of Montana. (\$2,500)	2011
McIntire-Stennis grant. Submitted through PI Dr. Diana Six. Evaluating genetic divergence in a bark beetle-fungal symbiosis. (\$32,000)	2011-12
Entomological Society of America Presidents Prize for oral presentation.	2010
USDA CSREES National Needs Graduate Fellowship.	2009-12
Certificate of Merit. USDA Forest Service.	2005
Ynez Morey and Chuck Reagin Memorial Scholarship in Entomology. Colorado State University.	2000

PRESENTATIONS (2013-PRESENT)

Bracewell, R.R. 2020. The wacky world of chromosome evolution and centromere turnover in *Drosophila*.

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- Center for Theoretical and Evolutionary Genomics**, UC Berkeley, Berkeley, CA.
- Bracewell, R.R. 2019. Understanding “an inordinate fondness”: Sex chromosome evolution and speciation in beetles. **University of Rochester**, Rochester, NY.
- Bracewell, R.R., B.J. Bentz and J.M. Good. 2018. The evolution of neo-sex chromosomes in tree killing *Dendroctonus*. **Annual meeting of the Entomological Society of America**, Vancouver, BC, Canada.
- Bracewell, R.R., Karen Wong Miller and Doris Bachtrog. 2018. The genomics of behavioral evolution and speciation in the *Drosophila athabasca* species complex. **Population, Evolutionary and Quantitative Genetics Conference**, Madison, WI. (Poster)
- Bracewell, R.R., Karen Wong Miller and Doris Bachtrog. 2017. Population genomics of incipient speciation in the *Drosophila athabasca* species complex. **Annual Drosophila Research Conference**, San Diego, CA. (Poster)
- Bracewell, R.R. 2016. Neo sex chromosome evolution and speciation in the mountain pine beetle. **Center for Theoretical and Evolutionary Genomics**, UC Berkeley, Berkeley, CA.
- Bracewell, R.R., M. Nalley and D. Bachtrog. 2016. Identification of QTLs for male courtship song using a high-resolution genetic map of *Drosophila athabasca*. **Allied Genetics Conference**, Orlando, FL, 2016. (Poster)
- Bracewell, R.R., D. Vanderpool, J.M. Good, and D.L. Six. 2016. Cascading speciation among mutualists and antagonists in a tree-beetle-fungus interaction, **Evolution**, Austin, TX.
- Bracewell, R.R. and J.M. Good. 2015. The evolution of sex-specific specialization on neo-XY chromosomes. **Annual Meeting of the American Genetic Association**, Bainbridge Island, WA. (Poster)
- Bracewell, R.R., B.J. Bentz, and J.M. Good. 2015. Neo-sex chromosome evolution and speciation in the mountain pine beetle. **Gordon Research Conference on Speciation**, Ventura, CA. (Poster)
- Bracewell, R.R., J.M. Good and D.L. Six. 2014. Evolution in a bark beetle-fungal symbiosis: A phylogenomic and population genetic analysis of the mutualistic symbionts of the western pine beetle. **Annual meeting of the Entomological Society of America**, Portland, OR.
*Presidents Prize Winner for oral presentation
- Bracewell, R.R., B.J. Bentz, and J.M. Good. 2014. Rapid speciation along a genetic continuum in a neo-XY bark beetle. **Evolution**, Raleigh, NC.
- Bracewell, R.R., B.J. Bentz, and J.M. Good. 2013. A progression of rapidly evolving reproductive incompatibilities in the mountain pine beetle. **Evolution**, Snowbird, UT.
- Bracewell, R.R. Bringing together ecology and evolution to better understand bark beetle-fungal symbioses. 2013. **Western Forest Insect Work Conference**, Coeur d’Alene, Idaho.
*Memorial scholarship recipient and invited speaker

TEACHING EXPERIENCE

Instructor

Forest Insects and Disease (FOR 232). ~40 students. University of Montana. Spring 2013

Guest lecturer

Field Genomics Short Course. ~20 students. UC Berkeley. Summer 2019

Human Genetics and Genomics (IB 164). ~50 students. UC Berkeley. Fall 2016

Genetics and Evolution (BIOB 272). ~200 students. University of Montana. Spring 2015

Multiple Resource Silviculture (FORS 347). ~40 students. University of Montana. Fall 2012

Teaching assistant

Genetics and Evolution (BIOB 272). University of Montana. Spring 2015

Multiple Resource Silviculture (FORS 347). University of Montana. Fall 2012

Conservation Genetics and Management (WILD 4880). Utah State University. Fall 2007

Ecology of Our World (WILD 2200). Utah State University. Fall 2006

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UNDERGRADUATE MENTORING EXPERIENCE

Anita Tran , UC Berkeley, 2018-present	Percival Xu Chen , UC Berkeley, 2018-19
Vennela Devanaboyina , UC Berkeley, 2018-19	Leilani Chu , UC Berkeley, 2017-18
Amira Joseph , UC Berkeley, 2017-18	Mengwei Hu , UC Berkeley, 2016
Sarah Blaine , UC Berkeley, 2016	Joseph Dysthe , University of Montana, 2011-15
Pamela Erm , University of Montana, 2012-13	Travis Serdar , University of Montana, 2013
Emery Fogg , University of Montana, 2013	Trevor Lasher , University of Montana, 2011-12
Elizabeth Susky , University of Montana, 2010	

SERVICE, COMMUNITY AND OUTREACH

Reviewer: Molecular Biology and Evolution, Molecular Ecology, Ecology and Evolution, Canadian Entomologist, PLoS One, Biology Letters, Environmental Entomology, Western Journal of Applied Forestry, FEMS Microbiology Ecology, Canadian Journal of Forest Research, Fungal Ecology, Communications Biology, Molecular Ecology Resources.

NIH/Scholastic Pathways mini-magazine profile to promote STEM careers (Grades 6-12).	2019
Presentations on insect diversity (Parkmead Elementary).	2018
Story Lab Retreat participant. "Breaking down barriers in science communication". University of Montana.	2014
Presentation to Darby Ranger District, Bitterroot National Forest, MT. "Biology of forest pests".	2014
Peaks and Potentials youth summer camp instructor. "Bark beetles and climate change". Montana State University.	2013
ConGen Data Analysis Course volunteer. Flathead Lake Bio Station. University of Montana.	2013
Montana Natural History Center field trip leader. "The Mountain Pine Beetle Outbreak: Perspectives from the Beetles and the Forests they Attack".	2011
Bonner Elementary field trip leader on forest ecology and insect outbreaks.	2011

MEDIA

Assisted with PBS KQED's Deep Look Series episode, "It's a goopy mess when pines and beetles duke it out".	2017
Featured with Dr. Diana Six in the Showtime series "Years of Living Dangerously".	2014
Assisted in filming the mountain pine beetle life cycle for CBC series "The Nature of Things".	2013
Research featured in the University of Montana Kaimin.	2012
Assisted in filming mountain pine beetle life history for the BBC series "Yellowstone".	2008

PREVIOUS RESEARCH EXPERIENCE

Laboratory Technician. Bee Biology and Systematics Lab. Utah State University. <i>Insect curation and database management.</i>	2005-06
Laboratory Technician. Dr. Karen Mock's Conservation Genetics Lab. Utah State University. <i>Population genetics of the mountain pine beetle using AFLPs.</i>	2005-06
Biological Technician (GS-5). USDA Forest Service, RMRS, Bark Beetle Group. Logan, UT. <i>Worked on projects investigating antiaggregants for whitebark pine protection, bark beetle trap type effectiveness, impact of prescribed fire on insect outbreaks, and the effects of thinning on beetle populations.</i>	2004-06

PROFESSIONAL SOCIETIES

Society for the Study of Evolution	Genetics Society of America
Entomological Society of America	Western Forest Insect Work Conference