

Department of Integrative Biology & Museum of Vertebrate Zoology
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EDUCATION

PhD	University of California, Berkeley <i>Museum of Vertebrate Zoology</i> <i>Department of Integrative Biology</i> Advisor: Michael W. Nachman	2015 - present
MS	University of Minnesota <i>Integrated Biosciences</i> Advisor: Matthew T. Andrews	2013-2015
BS	Black Hills State University , <i>Magna cum laude</i> <i>School of Natural Sciences</i>	2009-2013

PUBLICATIONS

8. Wilsterman, K., **Ballinger, M.A.** and Williams, C.M. (*in review*). A universal framework for programmed dormancy in animals. *American Naturalist*.
7. Mack, K.L., **Ballinger, M.A.**, Phifer-Rixey, M. and Nachman, M.W. (*in review*). Divergent patterns of copy number variation in natural populations of house mice (*Mus musculus domesticus*) along an environmental gradient. *Molecular Biology and Evolution*.
6. Mack, K.L., **Ballinger, M.A.**, Phifer-Rixey, M. and Nachman, M.W. (2018). Gene regulation underlies environmental adaptation in house mice. *Genome Res*, 28(11): 1636-1645. doi: 10.1101/gr.238998.118.
5. **Ballinger, M.A.** and Andrews, M.T. (2018). Nature's fat burning machine: brown adipose tissue in a hibernating mammal. *J Exp Biol*, 221: jeb162586. doi: 10.1242/jeb.162586.
4. **Ballinger, M.A.** and Noor, M.A.F. (2017). Are lethal alleles too abundant in humans? *Trends Genet*, 34(2): 87-89. doi: 10.1016/j.tig.2017.12.013.
3. **Ballinger, M.A.**, Schwartz, C. and Andrews, M.T. (2017). Enhanced oxidative capacity of ground squirrel brain mitochondria during hibernation. *Am J Physiol Regul Integr Comp Physiol*, 312(3): R301-R310. doi: 10.1152/ajpregu.00314.2016.
2. **Ballinger, M.A.**, Hess, C., Napolitano, M.W., Bjork, J.A. and Andrews, M.T. (2016). Seasonal changes in brown adipose tissue mitochondria in a mammalian hibernator: from gene expression to function. *Am J Physiol Regul Integr Comp Physiol*, 311(2): R325-R336. doi: 10.1152/ajpregu.00463.2015.
1. Schwartz, C., **Ballinger, M.A.** and Andrews, M.T. (2015). Melatonin receptor signaling contributes to neuroprotection upon arousal from torpor in the thirteen-lined ground squirrel. *Am J Physiol Regul Integr Comp Physiol*, 309(10): R1292-1300. doi: 10.1152/ajpregu.00292.2015.

GRANTS, FELLOWSHIPS, AWARDS, and HONORS

2019	Philomathia Graduate Fellowship in Environmental Sciences, <i>UC Berkeley</i>	\$20,000
	Junea W. Kelly Fellowship, <i>Museum of Vertebrate Zoology</i>	\$12,500
	Summer Research Grant, <i>Department of Integrative Biology</i>	\$1,675
	Wilhelm L.F. Martens Fund, <i>Museum of Vertebrate Zoology</i>	\$1,000
2018	Grant-in-Aid of Research, <i>American Society of Mammalogists</i>	\$1,500
	Wilhelm L.F. Martens Fund, <i>Museum of Vertebrate Zoology</i>	\$1,500
	MVZ Student Travel Fund, <i>Museum of Vertebrate Zoology</i>	\$500
2017	Albert P. Hendrickson Fund, <i>Museum of Vertebrate Zoology</i>	\$1,500
	Student Mentoring and Research Teams (SMART), <i>UC Berkeley</i>	\$2,000
2016	Rosemary Grant Award, <i>Society for the Study of Evolution</i>	\$2,000
	GRAC Travel Grant, <i>UC Berkeley</i>	\$250
	GRAC Research Grant, <i>UC Berkeley</i>	\$300
	Conference Travel Grant, <i>UC Berkeley</i>	\$550
	Graduate Assembly Travel Award, <i>UC Berkeley</i>	\$300
	Carl B. Koford Fund, <i>Museum of Vertebrate Zoology</i>	\$2,000
2015	Graduate Research Fellowship, <i>National Science Foundation</i>	\$138,000
	Scientific Meeting Grant, <i>The Company of Biologists</i>	\$2,300
	Graduate Women in Science Travel Award, <i>Xi Chapter</i>	\$100
	Dr. Dolittle Travel Award, <i>American Physiological Society</i>	\$585
	Scholander Award Nominee, <i>American Physiological Society</i>	
	Intersociety Meeting Travel Award, <i>American Physiological Society</i>	\$300
	Integrated Biosciences Travel Award, <i>UM Duluth</i>	\$500
	SCSE Student Travel Award, <i>UM Duluth</i>	\$400
	Small Grant-in-Aid of Conference Travel Award, <i>UM Duluth</i>	\$400
2011-2013	South Dakota Biomedical Research Infrastructure Network (SD BRIN) Fellowship, <i>BHSU</i>	\$24,000
2012	Biology Scholarship, <i>BHSU School of Natural Sciences</i>	\$300
2011	Science Scholarship, <i>BHSU School of Natural Sciences</i>	\$200
2009-2013	Dean's Award for Academic Excellence, <i>BHSU</i>	
2009-2013	South Dakota Opportunity Scholarship	\$5,000

TEACHING EXPERIENCE

University of California, Berkeley

Spring 2019 Graduate Student Instructor, *Human Reproduction (IB 140)*

Spring 2019 Guest Lecture, *Neurozoology: Animal behavior and the environment (IB 198) – "Evolution and Ecology of Seasonal Dormancy"*

Fall 2018 Graduate Student Instructor, *Mammalogy (IB 173LF)*

Fall 2018 Guest Lecture, *Mammalogy (IB 173LF) – "Physiological ecology of dormancy"*

University of Minnesota, Duluth

Spring 2015 Teaching Assistant, *Molecular Biology Laboratory (BIOL 5232)*

Fall 2014 Teaching Assistant, *General Biology I (BIOL 1011)*

Spring 2014 Teaching Assistant, *General Microbiology (BIOL 4501)*

Fall 2013 Teaching Assistant, *Genetics (BIOL 2201) and Cell Biology (BIOL 2101)*

CONTRIBUTED PRESENTATIONS

- 2019 **Ballinger, M.A.**, Hoang, N. and Nachman, M.W. Plasticity and evolutionary divergence in tail length between tropical and temperate house mice. *American Society of Mammalogy* - Washington, D.C. 2019.
- Ballinger, M.A.** and Nachman, M.W. The role of phenotypic plasticity in adaptive evolution of house mice. *Society for the Study of Evolution* – Providence, RI. 2019.
- Longo, T., Bragger, J., **Ballinger, M.A.**, Nachman, M.W. and Phifer-Rixey, M. Variation in reproductive traits among house mice from different regions in the Americas. *Society for the Study of Evolution* – Providence, RI. 2019.
- Ballinger, M.A.**, Treidel, L.A. and Nachman, M.W. Physiological, morphological, and behavioral plasticity to cold acclimation in temperate and tropical house mice. *Society for Integrative and Comparative Biology* – Tampa, FL. 2019.
- 2018 **Ballinger, M.A.** and Nachman, M.W. Parallel adaptation in two co-distributed species along a latitudinal cline. *Genetics Society of America, Population, Evolutionary, and Quantitative Genetics* – Madison, WI. 2018.
- Nachman, M.W., Phifer-Rixey, M., Mack, K.L., **Ballinger, M.A.**, Bi, K., Ferris, K.G., Sheehan, M.J., Lin, D., Keeble, S.M., Good, J.M. and Suzuki, T.A. The genomic basis of environmental adaptation in house mice. *Genetics Society of America, Population, Evolutionary, and Quantitative Genetics* – Madison, WI. 2018.
- Mack, K.L., **Ballinger, M.A.**, Phifer-Rixey, M. and Nachman, M.W. Divergent patterns of copy number variation in natural populations of house mice (*Mus musculus domesticus*) along an environmental gradient. *Genetics Society of America, Population, Evolutionary, and Quantitative Genetics Conference* – Madison, WI. 2018.
- Ballinger, M.A.**, Lin, J., Longo, T., Heyer, G.P., Phifer-Rixey, M., Ferris, K.F. and Nachman, M.W. Phenotypic variation between temperate and tropical populations of house mice. *Society for Integrative and Comparative Biology* – San Francisco, CA. 2018.
- Ferris, K.G., **Ballinger, M.A.**, Heyer, G., Phifer-Rixey, M., Bi, K., Suzuki, T.A. and Nachman, M.W. The genetic basis of adaptation to extreme climates in house mice across the Americas. *Society for Integrative and Comparative Biology* – San Francisco, CA. 2018.
- Mack, K.L., **Ballinger, M.A.**, Phifer-Rixey, M. and Nachman, M.W. Adaptive variation in gene regulation in mice. *Society for Integrative and Comparative Biology* – San Francisco, CA. 2018.
- Wilsterman, K., **Ballinger, M.A.** and Williams, C.M. Winter dormancy in insects and mammals: a new, comparative framework. *Society for Integrative and Comparative Biology* – San Francisco, CA. 2018.
- 2017 Ferris, K.G., Phifer-Rixey, M., Chavez, A.S., Bi, K., **Ballinger, M.A.**, Heyer, G.P., Suzuki, T.A. and Nachman, M.W. The genetics of rapid adaptation to extreme environments in house mice across the Americas. *Society for the Study of Evolution* - Portland, OR. 2017.
- Ferris, K.G., Phifer-Rixey, M., Chavez, A.S., Bi, K., **Ballinger, M.A.**, Heyer, G.P., Suzuki, T.A. and Nachman, M.W. The genomics of rapid adaptation to climatic extremes in house mice across the Americas. *Society for Integrative and Comparative Biology* – New Orleans, LA. 2017.
- 2016 **Ballinger, M.A.**, Ferris, K.G. and Nachman, M.W. Environmental adaptation and phenotypic differences between temperate and tropical populations of house mice. *Society for the Study of Evolution* – Austin, TX. 2016.

- Hess, C., **Ballinger, M.A.**, Napolitano, M.W., Bjork, J.A. and Andrews, M.T. Temperature effect on seasonal mitochondrial metabolism in a mammalian hibernator. *15th International Hibernation Symposium* – Las Vegas, NV. 2016
- 2015 Andrews, M.T., **Ballinger, M.A.**, and Schwartz, C. Melatonin receptor signaling contributes to neuroprotection upon arousal from torpor. *Melatonin Biology: Actions and Therapeutics* – Libson, Portugal. 2015.
- Ballinger, M.A.** Seasonal metabolism of brown adipose tissue and brain mitochondria in thirteen-lined ground squirrels. *UMD Department of Biology Seminar Series* – Duluth, MN. 2015.
- Andrews, M.T., **Ballinger, M.A.** and Hampton, M. Integrating molecular and functional analyses of brown adipose tissue across physiological extremes of natural hibernation. *Keystone symposia - beige and brown fat: basic biology and novel therapeutics* – Snowbird, UT. 2015.
- Ballinger, M.A.**, Schwartz, C., Bjork, J.A. and Andrews, M.T. Investigating the adaptive role of brain mitochondria in a mammalian hibernator. *Experimental Biology* – Boston, MA. 2015.
- 2014 **Ballinger, M.A.**, Napolitano, M.W., Bjork, J.A. and Andrews, M.T. Seasonal metabolism of brown adipose tissue in hibernating thirteen-lined ground squirrels. *American Physiological Society Intersociety Meeting* – San Diego, CA. 2014.

SYNERGISTIC ACTIVITIES

- Outreach: Tour Guide, Museum of Vertebrate Zoology (Berkeley, CA, 2016-present)
 MVZ Cal Day volunteer (Berkeley, CA, 2016-present)
 Judge, Madera Elementary School Science Fair (El Cerrito, CA, 2019)
 Judge, Sequoia Elementary School Science Fair (Oakland, CA, 2018)
 Mentor, “Be a Scientist”, Willard Middle School (Berkeley, CA, 2016)
 Graduate Student Panelist, UMD Biology Club (Duluth, MN, 2015)
 Volunteer, UMD Bulldog Science Day (Duluth, MN, 2014)
 Judge, Northeast Minnesota Regional Science Fair (Duluth, MN, 2014)
- Development: SMART Graduate Mentor: 10-week summer program in which top graduate students create mentored research opportunities for promising undergraduates. This program broadens the professional development of doctoral students and fosters research skills and pathways to advanced studies and professional careers for undergraduates. (Summer 2017, UC Berkeley)
- Mentoring in Higher Education: Seminar to introduce graduate students to the role of mentoring in U.S. higher education, help guide graduate students as they mentor undergraduates at Berkeley, work in the context of a mentoring relationship with their graduate advisers and prepare for the mentoring they will do in future academic and non-academic careers. (Spring 2017, UC Berkeley)
- Teaching Colloquium: Semester long course focusing on professional development as an instructor and potential tenure-track faculty member. (Fall 2015, UC Berkeley)
- Mentor: Nicole Hoang, URAP undergraduate, UC Berkeley (2018-2019)
 Joie Lin, SMART undergraduate, UC Berkeley (2017)
 Alexandra Theis, UROP undergraduate, UM Duluth (2014-2015)
 Charles Sieberg, UROP undergraduate, UM Duluth (2013-2014)

Service:

Journal reviewer: *PeerJ* (1), *Evolution* (2), *Proceedings of the Royal Society B* (1)

MVZ student ambassador (2018-2019)

Co-coordinator, UC Berkeley Dept. Integrative Biology invited seminar speaker lunches (2015-2016)

Organizer, *Hibernation 3.0 Regional Conference*. (June 3-5, 2015 - UM Duluth)

Memberships:

Genetics Society of America, American Genetic Association, American Society of Mammalogists, Society for the Study of Evolution, Society for Integrative & Comparative Biology