

J Grey Monroe

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USDA-NIFA National Needs Fellow
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Graduate Degree Program in Ecology
Colorado State University
Fort Collins, CO 80523

<https://greymonroe.github.io>

EDUCATION

PhD, Ecology 2019 (expected)

Colorado State University, Fort Collins

Advisor: John K. McKay

Dissertation: The biology, genetics, and evolution of climate adaptation in plants

BSc Biology, *cum laude* 2012

Appalachian State University

Advisor: Matt Estep

Concentration: Evolution of centromeres in the *Andropogoneae*

EMPLOYMENT

R Developer and Data Analyst 2017-2018

United States Geological Survey

John Wesley Powell Center for Analysis and Synthesis, Fort Collins, CO

CO-OP in Plant Breeding and Genetics 2016 - 2017

Cargill

Specialty Seeds and Oil Innovation Center, Fort Collins, CO

Research Assistant 2013 - 2014

Duke University, Durham, NC

Herman Staats Lab, Pathology Dept

PUBLICATIONS

Monroe JG, Powell T, Price N, Howard A, Evans K, Mullen JL, Lovell JT, McKay JK. 2018. Drought adaptation in nature by extensive genetic loss-of-function. *bioRxiv*. doi: <https://doi.org/10.1101/372854>

Endriss SB, Vahsen ML, Bitume EV, **Monroe JG**, Turner KG, Norton AP, Hufbauer RA. The importance of growing up: juvenile environment influences dispersal of individuals and their neighbors. *Ecology Letters*. in press

Dittberner H, Korte A, Mettler-Altmann T, Weber A, **Monroe JG**, de Meaux J. 2018. Natural variation in stomata size contributes to the local adaptation of water-use efficiency in *Arabidopsis thaliana*. *Molecular Ecology*. in press

Price N, Moyers BT, Lasky JR, **Monroe JG**, Mullen JL, Lopez L, Oakley CG, Lin J, Agren J, Schrider DR, Kern AD, McKay JK. 2018. Combining population genomics and fitness QTL to identify the genetics of local adaptation in *Arabidopsis thaliana*. *PNAS*. 115:5028-5033.

- Monroe JG**, Markman DW, Beck WS, Felton AJ, Vahsen ML, Pressler Y. 2018. Eco-evolutionary Dynamics of Carbon Cycling in the Anthropocene. *Trends in Ecology and Evolution*. 33:213-225.
- Monroe JG**, Allen ZA, Tanger P, Mullen JL, Lovell JT, Moyers BT, Whitley D, McKay JK. 2017. *TSPmap*, a tool making use of traveling salesperson problem solvers in the efficient and accurate construction of high-density genetic linkage maps. *BioData Mining*. DOI 10.1186/s13040-017-0158-0.
- Rockenbach K, Havrid JC, **Monroe JG**, Triant DA, Taylor DR, Sloan DB. 2016. Positive Selection in Rapidly Evolving Plastid-Nuclear Enzyme Complexes. *Genetics* 204:1507-1522.
- Monroe JG**, McGovern C, Lasky J, Beck J, Grogan K, McKay JK. 2016. Adaptation to warmer climates by parallel functional evolution of *CBF* genes in *Arabidopsis thaliana*. *Molecular Ecology* 15:3632-3644.
- Mojica JP, Mullen J, Lovell JT, **Monroe JG**, Paul JR, Oakley CG, McKay JK. 2016. Genetics of water use physiology in locally adapted *Arabidopsis thaliana*. *Plant Science* 251:12-22.
- Zhu M, **Monroe JG**, Suhail Y, Villiers F, Mullen J, Pater D, Hauser F, Jeon BW, Bader JS, Kwak JM, Schroeder JI, McKay JK, Assman SM. 2016. Molecular and Systems Approaches towards Drought-tolerant Canola Crops. *New Phytologist* 210:1169-1189.

FELLOWSHIPS

Vice President of Research Fellowship, CSU (\$4,000)	2017 - 2018
USDA-NIFA National Needs Fellowship (\$138,000)	2015 - 2018
Program in Molecular Plant Biology Fellowship, CSU (\$39,000)	2014 - 2015

GRANTS

Research Mentoring to Advance Inclusivity in STEM, CSU (\$1,160)	2018
Doctoral Dissertation Improvement Grant, NSF (\$19,760) Title: The evolution of plant drought tolerance and gene function across historic drought frequency gradients	2017
Evo-Devo-Eco Network Grant, Harvard University (\$3,000) Title: Variation in developmental and physiological responses to a gradient of water availability in <i>Brachypodium</i>	2016

AWARDS AND HONORS

Graduate Degree Program in Ecology Travel Award, CSU (\$500)	2017
Ralph Baker Graduate Student Award for Research Excellence, CSU (\$500)	2017
NSF Graduate Research Fellowship (Honorable Mention)	2016
Ralph Baker Graduate Student Award for Research Excellence, CSU (\$500)	2016
PMPB Research and Scholarly Excellence Award, CSU (\$10,000)	2015
NSF Graduate Research Fellowship (Honorable Mention)	2015

GDPE Research and Scholarly Excellence Award, CSU (\$2,500)	2014
Frontiers and Techniques in Plant Science Workshop Scholarship, Cold Spring Harbor Laboratory (\$750)	2014

WORKSHOPS, WORKING GROUPS AND TRAINING

Research Intern, Drought Physiology group International Rice Research Institute, Los Banos, Philippines	2018
Genotype \times Environment Interactions Workshop, participant Wageningen University, Wageningen, Netherlands	2015
microMORPH Phenotypic Plasticity Workshop, invited participant Harvard University Arnold Arboretum, Boston, MA	2015
Plasticity and Novel Environments Working Group, invited participant National Evolutionary Synthesis Center, Durham, NC	2015
Frontiers and Techniques in Plant Science, invited participant Cold Spring Harbor Laboratory, Cold Spring Harbor, NY	2014

PRESENTATIONS

- Monroe JG.** 2018. Drought adaptation by extensive genetic loss-of-function (**invited**). Pennsylvania State University. State College, PA
- Monroe JG.** 2018. Drought adaptation by extensive genetic loss-of-function (**invited**). Emerging Technologies to Prevent Future Famines Symposium. Fort Collins, CO
- Monroe JG.** 2018. Emerging technologies to discover beneficial gene knockouts for climate adaptation (**invited**). International Rice Research Institute. Los Banos, Philippines
- Monroe JG.** 2018. From satellites to sequences: Discovering molecular targets of adaptation to remotely sensed drought histories (**invited**). Australian National University. Canberra, Australia
- Monroe JG.** 2017. Plant adaptation to climate: environments, phenotypes, genes (**invited**). Duke University. Durham, NC
- Monroe JG.** 2017. Plant adaptation to climate: environments, phenotypes, genes (**invited**). Appalachian State University. Boone, NC
- Monroe JG.** 2017. Next-Generation Drought Detection and Whole Genome Sequences to Study Adaptation in *Arabidopsis thaliana* (poster). Dupont-Pioneer Drought Tolerance Symposium. Fort Collins, CO.
- Monroe JG.** 2017. Plant adaptation along historic drought frequency gradients. Evolution 2017. Portland, OR.
- Monroe JG.** 2017. The evolution of an important life history trait predicted by remote sensed drought frequency. Front Range Student Ecology Symposium. Fort Collins, CO.

- Monroe JG.** 2017. Using Nature to Nurture: uncovering the evolution of drought tolerance in wild plants. Three Minute Thesis Competition. Fort Collins, CO.
- Monroe JG.** 2016. Evolution of drought tolerance explored using global drought frequency map (poster). Graduate Student Showcase. Fort Collins, CO.
- Monroe JG.** 2016. A global map of drought frequency using the Vegetative Health Index (poster). Genomics of Adaptation to Human Contexts. Fort Collins, CO.
- Monroe JG.** 2016. Adaptation to warmer climates by parallel molecular evolution. Evolution 2016. Austin, TX.
- Monroe JG.** 2015. Patterns of locally adaptive altered function and divergence in cold response genes along a temperature gradient in *Arabidopsis thaliana*. Guild of Rocky Mountain Ecologists and Evolutionary Biologists. Boulder, CO.
- Monroe JG.** 2015. Evolution of the ABA signaling pathway in the Brassicaceae (poster). Evolution 2015. Sao Paulo, Brazil.
- Monroe JG.** 2015. Environmental variability and the evolution of locally adaptive drought responses. MicroMOPRH Phenotypic Plasticity Workshop. Harvard Arnold Arboretum. Boston, MA.
- Monroe JG.** 2015. Teaching plasticity by experiment: "EnvironMentoring" of a high school student (lightening talk) National Evolutionary Synthesis Center Plasticity and Novel Environments Working Group. Durham, NC.

TEACHING

Guest lecturer	
Drought Tolerance Breeding Workshop, CSU	2018
Guest lecturer	
Ecosystem Ecology, CSU	2017
Teaching Assistant	
Molecular and General Genetics, CSU	2017
Assistant Instructor	
Software Carpentry Workshop, CSU	2016
Guest lecturer	
ECOL 592: Principles of Data Visualization Using R and ggplot2, CSU	2016

MENTORSHIP

Karter Johansen - theoretical population genetics of poly-allelic adaptation	2017
Colorado State University	
Tyler Powell - reverse genetics of adaptive loss-of-function alleles	2017
Colorado State University	
Julio Flores - awarded scholarship for research on plant ecotoxicology	2014-2015
Poudre High School	

ACADEMIC SERVICE

Lecturer: Implicit Bias

CSU Research Mentoring to Advance Inclusiveness in Science	2018
Assistant organizer	
BSURE Undergraduate Summer Mentorship Program	2017
Co-organizer	
Drought Tolerance in Agriculture and Natural Ecosystems Symposium	2017
DuPont-Pioneer and Colorado State University	
Assistant Organizer	
Front Range Student Ecology Symposium	2015, 2017
Graduate Degree Program in Ecology and Colorado State University	
Peer Review	
Evolution, New Phytologist, Theoretical and Applied Genetics, Evolutionary Applications, Scientific Reports	

SOFTWARE DEVELOPMENT

- J Grey Monroe.** soilcarbon: R package for interacting with Soil Radiocarbon Database
- J Grey Monroe.** genemodel: Gene Model Plotting in R. R package version 1.1.0.
<https://CRAN.R-project.org/package=genemodel>
- J Grey Monroe.,** Zachary Allen, Paul Tanger, Brook Moyers and Jack Mullen (2016). TSPmap: A Method Making Use of Traveling Salesperson Problem Solvers in the Construction of Genetic Linkage Maps. R package version 0.0.0.9000.
<https://github.com/mckaylab/tspmap>