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 review

Dittberner H, Korte A, Mettler-Altman 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) 2017
Title: The evolution of plant drought tolerance and gene function across historic drought frequency gradients

Evo-Devo-Eco Network Grant, Harvard University ($3,000) 2016
Title: Variation in developmental and physiological responses to a gradient of water availability in *Brachypodium*

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 2018

International Rice Research Institute, Los Banos, Philippines

Genotype × Environment Interactions Workshop, participant 2015

Wageningen University, Wageningen, Netherlands

microMORPH Phenotypic Plasticity Workshop, invited participant 2015

Harvard University Arnold Arboretum, Boston, MA

Plasticity and Novel Environments Working Group, invited participant 2015

National Evolutionary Synthesis Center, Durham, NC

Frontiers and Techniques in Plant Science, invited participant 2014

Cold Spring Harbor Laboratory, Cold Spring Harbor, NY

PRESENTATIONS

Monroe JG. 2018. Drought adaptation by extensive genetic loss-of-function **(invited)**. Pennsylvania State Univeristy. 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 Symyposium. 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 Paolo, 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

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