

MADISON R. BULLOCK

Biological Sciences, 2901 Main Street, Lubbock, TX 79409 | (816) 686-6186 | madbullo@ttu.edu

EDUCATION

Texas Tech University | Lubbock, TX

Ph.D. (Biology)

Expected 2026

Dissertation: "Lessons from Plants Past: Herbaria uses in the advancement of plant conservation."

Advisor: Dr. Matthew G. Johnson

Advisory Committee: Dr. Sara Fuentes-Soriano, Dr. Dylan W. Schwilk, Dr. Nicholas G. Smith, Dr. Natasja van Gestel

San Francisco State University | San Francisco, CA

M.S. (Ecology, Evolution, and Conservation Biology)

August 2021

Thesis: "Exploring evolutionary adaptations of leaf heteroblasty in subspecific taxa of Hawaiian *Chenopodium oahuense*."

Advisor: Dr. Jason T. Cantley

Advisory Committee: Dr. Kevin Simonin, Dr. Colleen Ingram

University of Missouri – Columbia | Columbia, MO

B.S. (Fisheries and Wildlife Sciences)

May 2018

Minor: Animal Sciences

RESEARCH EXPERIENCE

Texas Tech University

Sequencing Technician, Center for Biotechnology and Genomics

2024 – Present

Develop and implement innovative protocols for library preparation miniaturization to reduce reagent costs and increase throughput. Independently manage all aspects of a high-throughput targeted sequencing service, including sample preparation, library construction, targeted hybridization, and enrichment. Maintain instrumentation, troubleshoot workflows, and optimize methods to improve efficiency and data quality.

Texas Tech University

Research Assistant, Johnson Lab/Center for Biotechnology and Genomics

2022 – 2024

Conduct DNA extraction from plant tissue and evaluate sample quality using fluorescence quantification and gel electrophoresis. Prepare DNA for libraries sequencing. Ensure smooth laboratory and herbarium operations through routine equipment maintenance, organization, and inventory management. Collaborate with faculty and fellow researchers on wet-lab components of diverse projects. Provide training to undergraduate students and lab members on laboratory protocols and best practices.

LRC Systems

GlobalViral Junior Fellow

2018 – 2021

Studied the benefits and bounds of chimerism in a model invertebrate species through comparing survival of monogenetic and chimeric colonies. Researched a newly described endangered Hawaiian plant taxa and their ability to exist and persevere in a harsh, xeric habitat via phylogenetic, population genetic, and morphometric analyses.

University of Missouri – Columbia

Research Assistant, College of Veterinary Medicine

2014 – 2017

Processed and cataloged biological specimens, including blood, saliva, semen, and tissue, for canine genetic research. Performed DNA extraction and conducted

commercial genetic testing for inherited diseases and traits. Maintained accurate and organized specimen databases to ensure data integrity. Collaborated with faculty on multiple research projects, contributing to experimental workflows and data collection. Supported laboratory outreach and fundraising initiatives through professional social media correspondence and community engagement.

TEACHING EXPERIENCE

Texas Tech University

Graduate Part Time Instructor, Department of Biological Sciences

Summer 2024

BIOL 1401: Biology of Plants

Designed and delivered lectures on fundamental plant biology concepts, including plant structure, physiology, diversity, and ecological significance. Implemented laboratory exercises to reinforce key topics and provide hands-on learning experiences. Assessed student performance through assignments, quizzes, and exams while providing constructive feedback to support learning. Managed classroom discussions and facilitated student engagement to enhance understanding of botanical principles.

Texas Tech University

Teaching Assistant, Department of Biological Sciences

Fall 2021, Spring 2024

BIOL 4301: Field Botany and Natural History Collections

BIOL3404: Evolution and Classification of Plants

Assisted in the presentation of lecture information, facilitated class discussion on assigned scientific literature via discussion questions and external knowledge, provided office hours for student questions and space to work on semester herbarium curation projects, reviewed weekly reflective journals and provided feedback.

San Francisco State University

Teaching Assistant, Department of Biology

Fall 2018, Spring 2019

BIOL 150: The World of Plants

Prepared lab lectures and activities, held weekly office hours, and supervised bimonthly field trips. Created and proctored weekly quizzes, and graded three major assignments: a field trip lab report, a botanical literature review, and a related presentation.

LEADERSHIP, COMMUNITY SERVICE, AND PROFESSIONAL AFFILIATIONS

Biological Collections in Ecology and Evolution Network

2024 – Present

- Near Peer Mentor, Botany 2025

2025 – Present

American Society of Plant Taxonomists (ASPT)

2024 – Present

- Student Representative, Promotional Materials Committee

2024 – Present

Society of Herbarium Curators (SHC)

2023 – Present

Biology Graduate Student Representative Committee

2022 – Present

Texas Tech University Association of Biologists (TTUAB)

2021 – Present

- Board of Directors
- President
- Texas Tech Annual Biological Sciences Symposium Planning Committee
- Vice President and SORC Representative
- Recycling Chair

2024 – Present

2023 – 2024

2022 – 2024

2022 – 2023

2021 – 2022

West Texas Association for Botany

2021 – Present

- Board of Directors
- President and SORC Representative

2025 – Present

2023 – 2025

Botanical Society of America (BSA)

2020 – Present

American Association for the Advancement of Science (AAAS)

2018 – Present

Bullock, M. R., & Cantley, J. T. (2022). *Exploring evolutionary adaptations of leaf heteroblasty in subspecific taxa of Hawaiian Chenopodium oahuense*. American Journal of Botany, 109(9), 1346–1359.
<https://doi.org/10.1002/ajb2.16058>

MANUSCRIPTS

Bullock, M. R., & Johnson, M. G. (in prep). *Library miniaturization for targeted sequencing of antique plant DNA: a valid method for per-sample cost reduction*. Applications in Plant Sciences.

Baker, R. *, **Bullock, M. R.** *, & Cantley, J. T. (in prep). *Exploring evolutionary processes promoting adaptive divergence across populations of Hawaiian Chenopodium oahuense (Amaranthaceae)*. *Authors contributed equally to the manuscript.

Hu, N., **Bullock, M. R.**, Jackson, C., Miller, C., Hunter, E., Huff, C., Handy, S., & Johnson, M. G. (in prep). *CODFATHER: A computational and targeted sequencing approach for mixed plant DNA identification with Angiosperms353*.

INVITED SEMINARS

Bullock, M. R., Salazar, J., Wagner, G., Smith, N. G., & Johnson, M. G. (2024, November). *The Botanical Time Capsule: Using herbaria to study the effects of global change on Guadalupe Mountains flora*. Presented virtually to the American Society of Plant Taxonomists as part of their Fall Webinar Series.

PRESENTATIONS AS PRESENTER

Bullock, M. R., Clugston, J. A. R., Slimp, M., & Johnson, M. G. (2025, July). *Getting SNPpy: A new bioinformatics workflow for the analysis of microhaplotypes from targeted plant sequences*. Oral paper presented at the Botanical Society of America, Palm Springs, CA.

Bullock, M. R., Clugston, J. A. R., Slimp, M., & Johnson, M. G. (2025, February). *Getting SNPpy: A new bioinformatics workflow for the analysis of microhaplotypes from targeted plant sequences*. Oral paper presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Bullock, M. R., Salazar, J., Wagner, G., Smith, N. G., & Johnson, M. G. (2024, June). *The Botanical Time Capsule: Using herbaria to study the effects of global change on Guadalupe Mountains flora*. Oral paper presented at the annual meeting of the Botanical Society of America, Grand Rapids, MI.

Bullock, M. R. & Johnson, M. G. (2024, February). *A Tale of Two Plants: Comparing the genetic diversity of two endemic and widespread congeneric pairs*. Oral paper presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Bullock, M. R. & Johnson, M. G. (2023, July). *It's a Small World After All: Applying library miniaturization and microhaplotypes to plant population genomic research*. Oral paper presented at the annual meeting of the Botanical Society of America, Boise, ID.

Bullock, M. R., Slimp, M., Hale, H., Coker, C., Bailey, Z., & Johnson, M. G. (2022, August). *Herbaria uses in ecosystem health assessments: Impacts of land use and climate change on flora in the Guadalupe Mountains over 50 years*. Oral paper presented at the annual meeting of the Texas Oklahoma Regional Consortium of Herbaria, Fort Worth, TX.

Bullock, M. R., Slimp, M., Hale, H., Coker, C., Bailey, Z., & Johnson, M. G. (2022, July). *Herbaria uses in ecosystem health assessments: Impacts of land use and climate change on flora in the Guadalupe Mountains over 50 years*. Oral paper presented at the annual meeting of the Botanical Society of America, Anchorage, AK.

Bullock, M. R., Williams, T. M., Martine, C. T., Haase, B., & Cantley, J. T. (2021, July). *Exploring the potential evolutionary adaptation of leaf heteroblasty in Hawaiian Chenopodium oahuense ssp. ilioensis*. Oral paper presented at the annual meeting of the Botanical Society of America, Virtual.

Bullock, M. R., Simonin, K. A., & Cantley, J. T. (2020, July). *Morphological adaptations within a young adaptive radiation of Hawaiian Chenopodium (Amaranthaceae)*. Poster presented at the annual meeting of the Botanical Society of America, Virtual.

PRESENTATIONS BY MENTEES

Botany 2025 (Palm Springs, CA)

Creek, R., **Bullock, M. R.**, Fokar, M., & Johnson, M. G. (2025, July). *Fun Sized Library Prep: Cost-Effective Target Capture Sequencing with Miniaturization*. Poster presented at the annual meeting of the Botanical Society of America, Palm Springs, CA.

Forman, B., **Bullock, M. R.**, & Johnson, M. G. (2025, July). *The “Trees” of Texas Flora: Investigating Phylogenetic Diversity and Where to Branch Out Next (It’s All Coming Together)*. Poster presented at the annual meeting of the Botanical Society of America, Palm Springs, CA.

Salazar, J., **Bullock, M. R.**, Wagner, G., Smith N., Johnson, M. G. & Bailey, Z. (2025, July). *Effects of Increased CO₂ on Stomata and Water Use Efficiency in Guadalupe Mountains National Park*. Oral paper presented at the annual meeting of the Botanical Society of America, Palm Springs, CA.

Texas Tech Annual Biological Sciences Symposium 2025 (Lubbock, TX)

Creek, R., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2025, February). *Fun Sized Library Prep: Cost-Effective Target Capture Sequencing with Miniaturization*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Forman, B., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2025, February). *The “Trees” of Texas Flora: Investigating Phylogenetic Diversity and Where to Branch Out Next (It’s All Coming Together)*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Salazar, J., **Bullock, M. R.**, Wagner, G., Smith N., Johnson, M. G. & Bailey, Z. (2025, February). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX

Botany 2024 (Grand Rapids, MI)

Salazar, J., **Bullock, M. R.**, Johnson, M. G., Bailey, Z. (2024, June). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the annual meeting of the Botanical Society of America, Grand Rapids, MI.

Transformative Undergraduate Experiences Symposium 2024 (Lubbock, TX)

Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2024, April). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Impact talk presented at the Transformative Undergraduate Experiences Symposium. Lubbock, Texas.

Texas Tech Annual Biological Sciences Symposium 2024 (Lubbock, TX)

Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2024, February). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Transformative Undergraduate Experiences Symposium 2023 (Lubbock, TX)

Mackey, A., Reyes, S., Williams, L., Ogbiede, J., **Bullock, M.**, & Johnson, M. (2023, October). *Physco killer - Testing for evidence of cryptic species in the moss Physcomitrium pyriforme*. Impact talk presented at the Transformative Undergraduate Experiences Symposium. Lubbock, Texas.

Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2023, October). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Impact talk presented at the Transformative Undergraduate Experiences Symposium. Lubbock, Texas.

Botany 2023 (Boise, ID)

- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2023, July). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Poster presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Mackey, A., Reyes, S., Ogbeide, J., Williams, L. D., **Bullock, M. R.**, Patel, N., Medina, R. A., Goffinet, B., & Johnson, M. G. (2023, July). *Testing for evidence of cryptic species in the widespread moss Physcomitrium pyriforme*. Poster presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2023, July). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the annual meeting of the Botanical Society of America, Boise, ID.

Texas Tech Annual Biological Sciences Symposium 2023 (Lubbock, TX)

- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2023, May). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.
- Mackey, A., Reyes, S., Ogbeide, J., Williams, L. D., **Bullock, M.R.**, Patel, N., Medina, R. A., Goffinet, B., & Johnson, M. G. (2023, May). *Testing for evidence of cryptic species in the widespread moss Physcomitrium pyriforme*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.
- Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2023, May). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.

Texas Tech Undergraduate Research Conference 2023 (Lubbock, TX)

- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2023, April). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Poster presented at the annual Texas Tech University Undergraduate Research Conference, Lubbock, TX.
- Mackey, A., Reyes, S., Ogbeide, J., Williams, L. D., **Bullock, M.R.**, Patel, N., Medina, R. A., Goffinet, B., & Johnson, M. G. (2023, April). *Testing for evidence of cryptic species in the widespread moss Physcomitrium pyriforme*. Poster presented at the annual Texas Tech University Undergraduate Research Conference, Lubbock, TX.
- Salazar, J., **Bullock, M. R.**, Bailey, Z., & Johnson, M. G. (2023, April). *Responses of Leaf Stomata to 50 Years of CO₂ Increase Using Herbarium Specimens*. Poster presented at the annual Texas Tech University Undergraduate Research Conference, Lubbock, TX.

Botany 2022 (Anchorage, AK)

- Ogbeide, J., **Bullock, M. R.**, Patel, N., Goffinet, B., Medina, R. A., Johnson, M. G. (2022, July). *Developing a Restriction Digest Marker to Identify Cryptic Species within Physcomitrium pyriforme*. Lightning talk presented at the annual meeting of the Botanical Society of America, Anchorage, AK.

PRESENTATIONS BY COLLABORATORS

- Hu, N., **Bullock, M. R.**, Jackson, C., Miller, C., Hunter, E., Handy, S., & Johnson, M. G. (2025, July). *A computational and targeted sequencing approach for mixed plant DNA identification with Angiosperms353*. Oral paper presented at the annual meeting of the Botanical Society of America, Palm Springs, CA.
- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2025, July). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Oral paper presented at the annual meeting of the Botanical Society of America, Palm Springs, CA.

- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2025, February). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Oral paper presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.
- Hu, N., **Bullock, M. R.**, Miller, C., Hunter, E., Handy, S., Johnson, M. G. (2024, July). *Plant DNA identification with Angiosperm353: A computational and targeted sequencing approach*. Poster presented at the meeting of the International Botanical Congress, Madrid, Spain.
- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2024, February). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Oral paper presented at the Texas Tech Annual Biological Sciences Symposium, Lubbock, TX.
- Hosaka, M. J., **Bullock, M. R.**, Price, S., Johnson, M. G. (2023, April). *Characterizing Temporal Changes in Microbial Diversity in Herbarium Specimens from Guadalupe Mountains National Park*. Poster presented at the annual meeting of the Botanical Society of America, Grand Rapids, MI.
- Johnson, M. G., **Bullock, M. R.**, Jackson, C. J., Schwilk, D. W., Miller C., Wickett, N., Baker, W. J., Faist, A. M., Hunter, L., & Handy, S. M. (2023, July). *The next phase of Angiosperm353: improved targets, mixed DNA, and bioinformatics resources*. Oral paper presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Slimp, M., **Bullock, M. R.**, Mentag, R., Khayi, S., Fokar, M., & Johnson, M. G. (2023, July). *Ecological Bastion and Iconic Cultural Food: Conservation Genomics of the Argan Tree*. Oral paper presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Price, S., Jaeger, S., **Bullock, M. R.**, LoPresti, E. F., & Johnson, M. G. (2023, July). *Possible cryptic species in widespread Abronia fragrans complex species*. Oral paper presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Eludini, P. O., **Bullock, M. R.**, Johnson, M. G., & Schwilk, D. W. (2023, July). *Woody cover negatively affects diversity of the aboveground plant community and soil seedbank in central Texas*. Poster presented at the annual meeting of the Botanical Society of America, Boise, ID.
- Johnson, M. G., Chen, Y., Price, S., **Bullock, M. R.**, Slimp, M., & Patel, N. (2022, July). *Analysis of Target Capture Data for Phylogenetics and Population Genetics*. Workshop taught and presented at the annual meeting of the Botanical Society of America, Anchorage, AK.
- Cantley, J. T., **Bullock, M. R.**, Williams, T. M., Haase, B., & Martine, C. T. (2022, July). *Exploring evolutionary processes promoting adaptive divergence across populations of Hawaiian Chenopodium oahuense (Amaranthaceae)*. Oral paper presented at the annual meeting of the Botanical Society of America, Anchorage, AK.

RELATED EXPERIENCE

Texas Tech University

Herbarium Curation Assistant, E. L. Reed Herbarium

2022 – 2024

Coordinate undergraduate research activities within the herbarium, providing mentorship and training on specimen digitization, imaging, and data entry. Oversee the accurate refiling of specimens into appropriate collection locations and reorganization projects to align with current taxonomic classifications. Perform specimen preparation and mounting to ensure long-term specimen integrity. Manage inventory and accession records, verify and update specimen metadata, and assist with responding to loan and exchange requests from other institutions.

San Francisco State University

Lab Assistant, Genomics/Transcriptomics Analysis Core

2018 – 2021

Tested, calibrated, and maintained laboratory equipment in compliance with regulations and standard operating procedures to ensure safety, accuracy, and reliability. Monitored and recorded daily inventory of laboratory supplies, placing orders for low-stock items to maintain operational efficiency and support a positive user experience.

AWARDS AND FELLOWSHIPS

E. L. Reed Legacy Endowment Scholarship, Texas Tech University (\$800)	April 2025
LaDuke Scholarship, Texas Tech University (\$1,000)	August 2024
TTUAB Officer Award, Texas Tech University (\$1,000)	July 2024
TTUAB Officer Award, Texas Tech University (\$1,000)	July 2023
TTU Graduate Student Research Support, Texas Tech University (\$1,500)	February 2023
TTUAB Officer Award, Texas Tech University (\$250)	June 2022
Helen DeVitt Jones Graduate Fellowship, Texas Tech University (\$15,000)	August 2021
Instructionally Related Activities Research Award, San Francisco State University (\$500)	December 2019
Boundaries of Life Fellowship, San Francisco State University (\$21,000)	August 2018
Donald P. Duncan Scholarship, University of Missouri – Columbia (\$500)	August 2017
Bright Flight Scholarship, University of Missouri – Columbia (\$6,000)	August 2014
CAFNR Award, University of Missouri – Columbia (\$4,000)	August 2014
Elsa “Elsie” Kemble Memorial Scholarship, University of Missouri – Columbia (\$2,000)	August 2014
Bright Flight Scholarship, University of Missouri – Columbia (\$6,000)	August 2014
Chancellor’s Award, University of Missouri – Columbia (\$28,800)	August 2014