

# JESSICA SIJIA GUO

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## EDUCATION

**PhD**, May 2019, Biology, Northern Arizona University  
Dissertation: Hydraulic regulation and carbohydrate dynamics in a common desert shrub (*Larrea tridentata*)  
Certificate of Statistics, 2015, Mathematical and Statistical Sciences, Arizona State University  
**MS**, December 2013, Biology, Northern Arizona University  
Thesis: Interspecific variation in functional rooting depth in plant communities along an elevational gradient in the southwestern United States  
**BA**, May 2010, *magna cum laude*, Environmental Biology, Columbia University

## APPOINTMENTS

2020- Data Scientist, CCT Data Science Group, University of Arizona  
2019-2020 Postdoctoral Scientist, Geology and Geophysics, University of Utah  
2016-2019 Graduate Teaching Assistant, Biological Sciences, Northern Arizona University  
2015 STEM Outreach Fellow, NASA Space Grant, Arizona State University

## GRANT SUPPORT

### Active

**NSF – Division of Integrative Organismal Systems** \$499,000 (\$218,650 to UA)  
RCN: PSInet – a global water potential network. Kim Novick (PI, Indiana U.-Bloomington), **Jessica Guo** (institutional PI), Dan Johnson (co-PI, U. of Georgia), Kate McCulloh (co-PI, U. of Wisconsin-Madison). 2023-2027.

## PUBLICATIONS

\* co-first authorship

### Published or in press

20. Wheeler, K., M. Dietze, D. LeBauer, J. Peters, A.D. Richardson, Q. Thomas, K. Zhu, U. Bhat, S. Munch, R.F. Buzbee, M. Chen, B. Goldstein, **J.S. Guo**, D. Hao, C. Jones, M. Kelly-Fair, H. Liu, C. Malmberg, N. Neupane, D. Pal, A.A. Ross, V. Shirey, Y. Song, M. Steen, E.A. Vance, W. Woelmer, J. Wynne, L. Zachmann. Predicting spring phenology in deciduous broadleaf forests: NEON phenology forecasting community challenge. Accepted at *Agricultural and Forest Meteorology*.
19. Richardson, K.M., M.R. Jospe, A.A. Saleh, T.N. Clarke, A.R. Bedoya, N. Behrens, K.M.K. Marano, L. Cigan, Y. Liao, E.R. Scott, **J.S. Guo**, A. Aguinaga, S.M. Schembre. Use of

- biological feedback as a health behavior change technique in adults: scoping review. 2023. *Journal of Medical Internet Research*. <https://doi.org/10.2196/44359>
18. Samuels-Crow, K.E., D.M.P. Peltier, Y. Liu, **J.S. Guo**, J.M. Welker, W.R.L. Anderegg, G.W. Koch, C. Schwalm, M. Litvak, J. Shaw, K. Ogle. The importance of monsoon precipitation for foundation tree species across the semiarid southwestern U.S. 2023. *Frontiers in Forests and Global Change*. <https://doi.org/10.3389/ffgc.2023.1116786>
  17. \*Gornish, E.S., \***J.S. Guo**, L.M. Porensky, B.L. Perryman, E.A. Leger. Pre-fire grazing treatments can affect post-fire vegetation in a dryland system. 2023. *Ecological Solutions and Evidence*. <https://doi.org/10.1002/2688-8319.12215>
  16. Kannenberg, S.A., M.L. Barnes, D.R. Bowling, A.W. Driscoll, **J.S. Guo**, W.R.L. Anderegg. Quantifying the drivers of ecosystem carbon-water cycling across the soil-plant-atmosphere continuum in an arid woodland. 2023. *Agricultural and Forest Meteorology*. <https://doi.org/10.1016/j.agrformet.2022.109269>
  15. Peltier, D.P., W.R.L. Anderegg, **J.S. Guo**, K. Ogle. 2022. Contemporary tree growth shows altered climate memory. *Ecology Letters*. <https://doi.org/10.1111/ele.14130>
  14. **Guo, J.S.**, \*S.E. Bush, K.R. Hultine. 2022. Temporal variation in stomatal sensitivity to vapor pressure deficit in western riparian forests. *Functional Ecology*. <https://doi.org/10.1111/1365-2435.14066>
  13. Bowen, G.J., **J.S. Guo**, S. Allen. 2022. A 3-D groundwater isoscape of the contiguous USA for forensic and water resource science. *PLOS One*. 17(1): e0261651.
  12. Kannenberg, S., **J.S. Guo**, K. Novick, W. Anderegg, X. Feng, D. Kennedy, A. Konings, J. Martínez-Vilalta, A. Matheny. 2022. Opportunities, challenges, and pitfalls in characterizing plant water-use strategies. *Functional Ecology*. 36(1): 24-37.
  11. Peltier, D.M.P., **J.S. Guo**, P. Nguyen, M. Bangs, L. Gear, M. Wilson, S. Jefferys, K. Samuel-Crow, L.L. Yocom, Y. Liu, M.K. Fell, D. Auty, C. Schwalm, W.R.L. Anderegg, G.W. Koch, M.E. Litvak, K. Ogle. 2021. Temperature memory and NSC mediate legacies of a hot drought in trees across the southwestern US. *Tree Physiology*. 42(1): 71-85.
  10. Mpanga, I.K., R. Tronstad, **J.S. Guo**, D. LeBauer, J. Idowu. 2021. On-farm land management strategies and production challenges in United States organic agricultural systems. *Current Research in Environmental Sustainability*. 3: 100097.
  9. Nagy, R.C., J.K. Balch, [et al., including **J.S. Guo**]. 2021. Harnessing the NEON data revolution to advance open environmental science with a diverse and data-capable community. *Ecosphere*. 12(12): e03833.
  8. Fiorella, R.P., S.P. Good, S.T. Allen, **J.S. Guo**, C.J. Still, D.C. Noone, W.R.L. Anderegg, C.R. Florian, H. Luo, N. Pingingtha-Durden, G.J. Bowen. Calibration strategies for detection macroscale patterns in NEON atmospheric carbon isotope observations. *Journal of Geophysical Research – Biogeosciences*. 126(3).
  7. Bush, S.E., **J.S. Guo**, D. Dehn, K. Grady, J. Hull, E. Johnson, D. Koepke, R. Long, D. Potts, K. Hultine. 2021. Adaptive versus non-adaptive responses to drought in a non-native riparian tree / shrub (*Tamarix* spp.). *Agricultural and Forest Meteorology*. 301-302: 108342.
  6. Peltier, D.M.P., **J.S. Guo**, P. Nguyen, M. Bangs, L. Gear, M. Wilson, S. Jefferys, K. Samuel-Crow, L.L. Yocom, Y. Liu, M.K. Fell, D. Auty, C. Schwalm, W.R.L. Anderegg, G.W. Koch, M.E. Litvak, K. Ogle. 2020. Temporal controls on crown non-structural carbohydrates and links to sapwood storage in southwestern US tree species. *Tree Physiology*. 41(3): 388-402.

5. **Guo, J.S.**, L. Gear, K.R. Hultine, G.W. Koch, K. Ogle. 2020. Non-structural carbohydrate dynamics associated with antecedent stem water potential and air temperature in a dominant desert shrub. *Plant, Cell & Environment*. 43(6): 1467-1483.
4. **Guo, J.S.**, K.R. Hultine, G.W. Koch, H. Kropp, K. Ogle. 2020. Temporal shifts in iso/anisohydry revealed from daily observations of plant water potential in a dominant desert shrub. *New Phytologist*. 225(2): 713-726.
3. Ogle, K., D.M.P. Peltier, M.K. Fell, **J.S. Guo**, H. Kropp, J.J. Barber. 2019. Should we be concerned about multiple comparisons in hierarchical Bayesian models? *Methods in Ecology and Evolution*. 10(4): 553-564.
2. **Guo, J.S.** and K. Ogle. 2019. Antecedent soil water content and vapor pressure deficit interactively control water potential in *Larrea tridentata*. *New Phytologist*. 221(1): 218-232.
1. **Guo, J.S.**, B.A. Hungate, T.E. Kolb, G.W. Koch. 2018. Water source niche overlap increases with site moisture availability in woody perennials. *Plant Ecology*. 219(6):719-735.

#### **Under review or in revision**

- Guo, J.S.**, S.A. Kannenberg, M.L. Barnes, W.R.L. Anderegg. Temporally-varying water use strategies in *Juniperus osteosperma* mediate ecosystem carbon fluxes. In revision at *New Phytologist*.
- Pal, D., K. Schaper, A. Thompson, **J.S. Guo**, P. Jaiswal, C. Lisle, L. Cooper, D. LeBauer, A. Thessen, A. Ross. Phenotype to genotype: Toward determining genetic basis for canopy height differences in sorghum. Submitted to *PLOS Computational Biology*.

#### **TEACHING**

##### **Data science workshops**

Understanding the foundations of ‘ggplot2’ (U of Arizona)	June 2023
Combining datasets using ‘dplyr’ (U of Arizona)	Mar 2023
Creating personal websites with Quarto (U of Arizona)	Oct 2022
Reproducibility and Data Science in R (U of Arizona)	Sep 2022
Data wrangling and visualization (U of Arizona BRIDGES)	May 2022
Dates and Times in R (U of Arizona)	Apr 2022
Reproducibility and Data Science in R (U of Arizona)	Feb 2022
Intro to Bayesian modeling (NCEAS)	Oct 2021
Critical Skills to Scale Up Ecology (ESA-SEEDS)	Sep 2021
Intro to Bayesian modeling in Ecology (ESA short course)	Aug 2021
Fitting leaf -level gas exchange data in R (U of Arizona)	Apr 2021

##### **Instructor of record**

Scientific Writing in Microbiology, upper-division	Spr 2018, Fa 2018, Spr 2019
Ecology Lab, upper division	Spr 2017

##### **Teaching assistant**

Applied Bayesian Modeling Lab, graduate	Fa 2016, Fa 2017
Biometry Lab, graduate	Fa 2014
Diversity of Life Lab, introductory	Spr 2013
Unity of Life Lab, introductory	Spr 2012, Fa 2012, Fa 2013

### **Guest lecturer**

Plant Physiological Ecology, upper-division	Fall 2023
Plant Functional Traits, upper-division	Spr 2023
Plants and Climate, upper-division	Spr 2017
Biometry, graduate	Fa 2014

### **FELLOWSHIPS**

2019	Columbia University Earth Institute Postdoctoral Fellowship (declined)
2015	ASU/NASA Space Grant Fellowship (Spring/Summer/Fall, \$25,400)
2011	Science Foundation of Arizona Graduate Fellow (\$8400)
2006-10	TW Lewis Foundation Scholar (\$20,000)

### **AWARDS AND HONORS**

#### **Research/Teaching**

2019	Research and Creativity Award: Most Promising Graduate Student
2018	Outstanding Graduate Teaching Award
2018	Graduate College Scholarship
2018	Jerry O. Wolff Student Enrichment Scholarship
2017	Honorable mention: Billings Award for an oral presentation at the ESA
2016	Brian Layton Cardall Memorial Scholarship
2015	Michael A. Cichan Memorial Award for Excellence in Botany
2012	Honorable Mention: NSF Graduate Research Fellowship

#### **Travel**

2020	ESA Power of Data Fellowship
2019	AGU Ecohydrology Tiny Grant award
2018	AGU Biogeosciences Section Caregiver Support award
2017	ESA Minority Ecologists Forum travel award
2016	ESA Physiological Ecology Section travel award

### **PRESENTATIONS**

#### **Invited talks**

2023	<b>Guo, J.S.</b> , K. Novick. Linking plant hydraulics and ecosystem function. Flux Course, University of Colorado Mountain Research Station. June 22.
2023	<b>Guo, J.S.</b> Dryland plant water use in a changing environment. Department seminar, School of Natural Resources and the Environment, University of Arizona. February 20.
2022	<b>Guo, J.S.</b> , S. Kannenberg, M. Barnes, W.R.L. Anderegg. Seasonally varying water use strategies in <i>Juniperus osteosperma</i> associated with GPP. American Geophysical Union, Fall Meeting, Chicago, Illinois, U.S.A., December 12-16.
2022	<b>Guo, J.S.</b> Sensitivity of plant water use to a changing environment. DeFord lecture, Jackson School of Geosciences, University of Texas at Austin. October 27.

- 2021 **Guo, J.S.**, S.E. Bush, K.R. Hultine. Riparian tree species vary in stomatal sensitivity to vapor pressure deficit across an aridity gradient in the eastern Great Basin, US. 106<sup>th</sup> Ecological Society of America, Annual Meeting, Hybrid, Long Beach, CA, U.S.A., August 1-6.
- 2020 **Guo, J.S.**, K.R. Hultine, G.W. Koch, H. Kropp, K. Ogle. Temporal patterns of plant water use: combining novel data and modeling approaches. 105<sup>th</sup> Ecological Society of America, Annual Meeting, Virtual, August 3-6.
- 2020 **Guo, J.S.** On the brink: plant water use in a drier future. Research seminar, Department of Biology, James Madison University. June 8.

### Contributed talks

- 2022 **Guo, J.S.**, S. Kannenberg, M. Barnes, W.R.L. Anderegg. Temporally-varying water use strategies in *Juniperus osteosperma* associated with GPP. 107<sup>th</sup> Ecological Society of America, Annual Meeting, Montreal, Quebec, Canada, August 14-19.
- 2018 **Guo, J.S.**, B. Hungate, T. Kolb, G. Koch. Water source niche overlap increases with site moisture availability in woody perennials. Geological Society of America, Joint Rocky Mountain/Cordilleran Section Meeting, Flagstaff, U.S.A., May 15-17.
- 2017 **Guo, J.S.**, L. Gear\*, K. Hultine, K. Ogle. Seasonal trends in leaf non-structural carbohydrates driven by depletion of starch in *Larrea tridentata*. 102<sup>nd</sup> Ecological Society of America, Annual Meeting, Portland, U.S.A., August 6-11.
- 2016 **Guo, J.S.**, K. Ogle. Antecedent soil moisture and VPD interactively control water potential and hydraulic thresholds in *Larrea tridentata*. 101<sup>st</sup> Ecological Society of America, Annual Meeting, Fort Lauderdale, U.S.A., August 7-12.

### Contributed posters

- 2022 **Guo, J.S.**, S. Kannenberg, M. Barnes, W.R.L. Anderegg. Temporally-varying water use strategies in *Juniperus osteosperma* associated with GPP. 18<sup>th</sup> Research Insights in Semiarid Ecosystems Symposium, Tucson, Arizona, U.S.A., November 5.
- 2022 **Guo, J.S.**, S. Kannenberg, M. Barnes, W.R.L. Anderegg. Temporally-varying water use strategies in *Juniperus osteosperma* associated with GPP. 3<sup>rd</sup> Multiscale Plant Vascular Biology GRC, Newry, Maine, U.S.A., June 5-10.
- 2020 **Guo, J.S.**, S.T. Allen, R.P. Fiorella, C.J. Still, W.R.L. Anderegg, G.J. Bowen. Vertical partitioning of root distributions correlated with ecophysiological characteristics: initial results from NEON megapit data. American Geophysical Union, Fall Meeting, virtual, December 1-17.
- 2019 **Guo, J.S.**, H. Kropp, G. Koch, K. Hultine, W.R.L. Anderegg, S. Allen, G. Bowen, K. Ogle. Declines in nighttime water potential vary seasonally in a common desert shrub. American Geophysical Union, Fall Meeting, San Francisco, CA, U.S.A., December 9-13.
- 2018 **Guo, J.S.**, K. Hultine, G. Koch, H. Kropp, K. Ogle. Testing iso/anisohydry as a plant-environment interaction in *Larrea tridentata*. American Geophysical Union, Fall Meeting, Washington, D.C., U.S.A., December 10-14.
- 2015 **Guo, J.S.**, Hultine, K., Ogle, K. Non-structural carbohydrates of woody plants in the Sonoran Desert. 100<sup>th</sup> Ecological Society of America, Annual Meeting, Baltimore, U.S.A., August 9-14.

- 2014 **Guo, J. S.**, B. Hungate, T. Kolb, and G. Koch. Low water availability decreases niche overlap of soil water resources in woody perennials. 99<sup>th</sup> Ecological Society of America, Annual Meeting, Sacramento, U.S.A., August 10-15.
- 2012 **Guo, J.S.**, B. Hungate, T. Kolb, and G. Koch. Variation in functional rooting depth and soil water partitioning along an elevation gradient in the southwestern U.S. American Geophysical Union, Fall Meeting, San Francisco, U.S.A., December 3-7.
- 2010 **Guo, J. S.**, J. I. Burton, M. I. Palmer, and D. J. Mladenoff. Inter- and intra-specific functional trait response to environmental change in an herbaceous forest understory. 95<sup>th</sup> Ecological Society of America, Annual Meeting, Pittsburgh, U.S.A., August 1-6.

## **SERVICE, OUTREACH, AND MENTORSHIP**

### **Professional service**

- 2023 Instructor, Physfest 4, UNM Sevilleta Field Station, NM
- 2023 NSF-ORCC panel review, Integrative Organismal Systems and Environmental Biology
- 2021 Ad-hoc review, NSF-IOS RCN proposal, Integrative Ecological Physiology Program
- 2020 NSF-IOS panel review, Integrative Ecological Physiology Program
- 2020 Organizer, Organized Oral Session at ESA “Plant water use strategies in a changing world”
- 2019 Ad-hoc review, NSF-IOS proposal, Integrative Ecological Physiology Program
- 2018 Co-organizer, Organized Oral Session at ESA “Ecophysiology of drought resilience and recovery”
- 2017 Organizer, Organized Oral Session at ESA “Evaluating lags and legacies of drought recovery”
- 2015 Travel grant reviewer, ASU Graduate and Professional Student Association
- 2014 Alumni career panelist, TW Lewis Foundation Leadership Conference, Phoenix, AZ
- 2012 Travel award reviewer, ESA-SEEDS
- Ongoing Member: Ecological Society of America, American Geophysical Union, Earth Science Women’s Network
- Ongoing Reviewer: *New Phytologist* (4), *Plant, Cell & Environment* (3), *Tree Physiology* (2), *Plant and Soil* (2), *American Journal of Botany* (1), *Methods in Ecology and Evolution* (1), *Trees* (1), *Conservation Physiology* (1), *Biogeosciences* (1)

### **Outreach**

- 2023 Steering committee for annual Research Bazaar Arizona conference on data science
- 2022 Chaired annual Research Bazaar Arizona conference on data science
- 2022 Organizing committee for the Women in Data Science (WiDS) Tucson event
- 2021 R lesson on spatial analysis of precipitation isotopes, published by Project EDDIE
- 2020 R lesson on spatial analysis of urban tap water isotopes, distributed to network of citizen scientists volunteering for waterisotopes.org
- 2019 “Isotope forensics with human breath”, Picarro activity, Geology Open House, Salt Lake City, UT
- 2019 “Why do plants matter?” presentation to Southwest Youth Camp at Dine College, Flagstaff, AZ
- 2017-18 Scientist in the Classroom, Kathryn Wertz’s 6<sup>th</sup> grade science class, Flagstaff, AZ

- 2017 Organized the NAU chapter of ESA-SEEDS students on a regional fieldtrip to the Mt. Lemmon Sky School and the Biosphere II, Tucson, AZ
- 2017 Science in the Park, Flagstaff Festival of Science, Flagstaff, AZ
- 2017 Public talk, “Life on the edge: carbohydrate dynamics of the creosote shrub”, Desert Botanical Garden, Scottsdale, AZ
- 2016-17 Consulting ecologist to AP Bio teacher Linda Lenz, Flagstaff, AZ
- 2016-17 Math/Science tutor at Kinlani Bordertown Dormitory, Flagstaff, AZ
- 2015 Global change and big data in R workshop for high school girls, Mesa Public Schools, Mesa, AZ
- 2015 Quantitative lesson development and demonstration to secondary science teachers, Advance Water Educator workshop, Tempe, AZ
- 2015 Statistics in R module to AP Environmental Science class at BASIS Chandler, Chandler, AZ
- 2014 Co-organized ESA-SEEDS field trip to CAP-LTER, Phoenix, AZ
- 2013-14 Contributor to ASU Ask a Biologist website (<https://askbiologist.asu.edu/>)

**Professional development - Research**

- 2023 NASA ARID scoping meeting, Tucson, AZ (invited)
- 2023 Fluxcourse, Mountain Research Station, CO
- 2021 Container Camp, Cyverse, virtual
- 2019 NEON Science Summit, Boulder, CO (invited)
- 2019 SPATIAL short course, Salt Lake City, UT
- 2019 NextProf: Science workshop, Ann Arbor, MI (invited)
- 2016 1<sup>st</sup> annual PhysFest workshop on plant ecophysiology, Manhattan, KS (invited)
- 2015 NIMBioS graduate student workshop on ecological statistics, Knoxville, TN (invited)
- 2014 Software Carpentry workshop for R and Linux, Tempe, AZ

**Professional development - Pedagogy**

- 2022 Making career-spanning learning in the life sciences inclusive and effective for all, The Banbury Center, Cold Spring Harbor Laboratory, virtual (invited)
- 2021 Instructor Training, The Carpentries, virtual
- 2019 Project EDDIE curriculum development workshop, Northfield, MN (invited)
- 2019 University Teaching Day, Flagstaff, AZ
- 2013 Seminar on Scientific Teaching, Tempe, AZ
- 2011 Seminar on College Teaching, Flagstaff, AZ

**Mentorship**

- 2023- Mentored UA undergraduate Kai Enright
- 2022- Mentored NAU PhD student Emma Reich in reproducibility and Bayesian modeling
- 2020 Remotely mentored Annelise Kelly and Bethany Alston as part of the MS for Secondary School Teachers program on R coding with NEON data
- 2019-20 Mentored U of U transfer student Michelle Williams
- 2016-17 Mentored NAU undergraduates Ryan Bishop and Linnea Gear; Linnea was funded as a NAU/NASA Space Grant Intern
- 2015 Alumni Mentor, ESA-SEEDS at 2015 ESA Annual Meeting, Baltimore, MD

- 2014-15 Mentored ASU undergraduates Samantha Daly, Joan Kwamboka, Brian Lopez, and Sam Teegarden; Sam was funded as an undergraduate research fellow by the School of Life Sciences
- 2012 Mentored NAU undergraduate Hannah Russell; Hannah was funded as a NAU/NASA Space Grant Intern
- 2011 Alumni mentor, ESA-SEEDS at 2011 ESA Annual Meeting, Austin, TX