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## EDUCATION

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| 1996 | B.S. | Crop Science | Agricultural University of Hebei, Baoding, China |
| 2002 | M.S. | Plant, Soil, and Environmental Science | West Texas A&M University, Canyon, Texas |
| 2005 | Ph.D. | Crop Science | Texas Tech University, Lubbock, Texas |

## PROFESSIONAL EXPERIENCE

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| 1996 - 1999 | *Lecturer*, Department of Agronomy, Handan Agricultural College, Handan, China |
| 2006 - 2013 | *Precision Agriculture Scientist*, South Plains Precision Ag, Plainview, TX |
| 2013 - 2016 | *Global Environmental Modeling Scientist*, Breeding Organization, Monsanto Company, St. Louis, MO |
| 2016 - present | *Assistant/Associate Professor of Crop Ecophysiology/Precision Agriculture*, Department of Plant and Soil Science, Texas Tech University, Lubbock, TX |
| 2019 - present | *Assistant/Associate Professor of Crop Ecophysiology/Precision Agriculture*, Texas A&M AgriLife Research, Lubbock, TX |

## AREAS OF EXPERTISE

- High-throughput plant phenotyping using unmanned aerial systems (UAS).
- Plant growth simulation and environmental modeling.
- Precision agriculture, including precision water and nutrient management integrating spatial technologies such as GPS, geographic information system, and remote sensing.
- Irrigation scheduling and precision water management
- Agricultural remote sensing and image analysis.
- Geospatial data analysis and mapping using GIS programs.
- Machine learning and deep learning in agriculture.
- Climate-smart agriculture and cropping systems.

## PUBLICATIONS

### Book Chapters

1. Guo, W., Cui, S., Torrion, J., & Rajan, N. (2015). Data-Driven Precision Agriculture: Opportunities and Challenges. In L. Rattan & B. A. Stewart (Eds.), *Soil-Specific Farming: Precision Agriculture* (pp. 353–372). CRC Press.
2. Guo, W., Gu, H., Adedeji, O., & Ghimire, B. (2023). Advances in Remote/aerial Sensing of Crop Water Status. In *Advances in Sensor Technology for Sustainable Crop Production*. Burleigh Dodds Science Publishing.

### Refereed Journals

1. Karn, R., Hillin, D., Helwi, P., Scheiner, J., & Guo, W. (2024). Assessing grapevine vigor as affected by soil physicochemical properties and topographic attributes for precision vineyard management. *Scientia Horticulturae, 328*, 112857.
2. Abdalla, A., Wheeler, T. W., Dever, J., Lin, J., Arce, J., & Guo, W. (2024). Assessing fusarium oxysporum disease severity in cotton using unmanned aerial system images and a hybrid domain adaptation deep learning time series model. *Biosystems Engineering, 237*, 220-231.
3. Singh, A., Deb, S. K., Slaughter, L. C., Singh, S., Ritchie, G. L., Guo, W., & Saini, R. (2023). Simulation of root zone soil water dynamics under cotton-silverleaf nightshade interactions in drip-irrigated cotton. *Agricultural Water Management, 288*, 108479.
4. Rabia, A. H., Neupane, J., Lin, Z., Lewis, K., Cao, G., & Guo, W. (2022). Principles and Applications of Topography in Precision Agriculture. *Advances in Agronomy, 171*, 143-189.
5. Neupane, J., Guo, W., Cao, G., Zhang, F., Slaughter, L., & Deb, S. (2022). Spatial patterns of soil microbial communities and implications for precision soil management at the field scale. *Precision Agriculture, 23*, 1008–1026.
6. Wen, M., Zhao, W., Guo, W., Wang, x., Li, P., Cui, J., Liu, Y., & Ma, F. (2022). Coupling effects of reduced nitrogen, phosphorus and potassium on drip-irrigated cotton growth and yield formation in Northern Xinjiang. *Archives of Agronomy and Soil Science, 68*(9), 1239-1250.
7. Neupane, J., Guo, W., Lin, Z., West, C., & Zhang, F. (2021). Effects of irrigation rates on cotton yield as affected by soil physical properties and topography in the Southern High Plains. *Plos One, 16*(10), e0258496.
8. Gikunda, R. M., Lawver, D., Baker, M., Boren Alpizar, A., & Guo, W. (2021). Extension education needs for improved adoption of sustainable organic agriculture in Central Kenya. *American Journal of Geographic Information System, 10*(2), 61-71.
9. Lin, Z., & Guo, W. (2021). Cotton stand counting from unmanned aerial system imagery using MobileNet and CenterNet deep learning models. *Remote Sensing, 13*(14), 2822.
10. Sun, Y., Guo, W., Weindorf, D., Sun, F., Deb, S., Cao, G., Neupane, J., Lin, Z., & Raihan, A. (2021). Field-scale calcium spatial variability in a semi-arid region: Implications for soil erosion and site-specific management. *Pedosphere, 31*(5), 705–714.

11. Gu, H., Lin, Z., Guo, W., & Deb, S. (2021). Retrieving surface soil water content using a soil texture adjusted vegetation index and unmanned aerial system images. *Remote Sensing, 13*(1), 145.
12. Lin, Z., & Guo, W. (2020). Sorghum head detection and counting using unmanned aerial system images and deep learning. *Frontiers in Plant Science, 11*, 1346.
13. Lin, Y., Zhu, Z., Guo, W., Sun, Y., Yang, X., & Kovalskyy, V. (2020). Continuous monitoring of cotton stem water potential using Sentinel-2 imagery. *Remote Sensing, 12*(7), 1176.
14. Pabuayon, I. L. B., Sun, Y., Guo, W., & Ritchie, G. (2019). High-throughput phenotyping in cotton: A review. *Journal of Cotton Research, 2*(1), 18.
15. Gusso, A., Guo, W., & Rolim, S. (2019). Reflectance-based model for soybean mapping in United States at common land unit scale with Landsat 8. *European Journal of Remote Sensing, 52*(1), 522-531.
16. Thompson, C. N., Guo, W., Sharma, B., & Ritchie, G. L. (2019). Using normalized difference red edge index to assess maturity in cotton. *Crop Science, 59*(5), 2167-2177.
17. Neupane, J., & Guo, W. (2019). Agronomic basis and strategies for precision water management: A review. *Agronomy, 9*(2), 87.
18. Guo, W. (2018). Spatial and temporal trends of irrigated cotton yield in the Southern High Plains. *Agronomy, 8*(12), 298.
19. Guo, W. (2018). Application of geographic information system and automated guidance system in optimizing contour and terrace farming. *Agriculture, 8*(9), 142.
20. Chen, T., Zeng, R., Guo, W., Hou, X., Lan, Y., & Zhang, L. (2018). Detection of stress in cotton (Gossypium hirsutum L.) caused by aphids using leaf level hyperspectral measurements. *Sensors, 18*(9), 2798.
21. Torrion, J., Maas, S., Guo, W., Bordovsky, J., & Cranmer, A. (2014). A three-dimensional index for characterizing crop water stress. *Remote Sensing, 6*(5), 4025-4042.
22. Guo, W., Maas, S. J., & Bronson, K. (2012). Relationship between cotton yield and soil electrical conductivity, topography, and Landsat imagery. *Precision Agriculture, 13*(6), 678-692.
23. Guo, W., & Maas, S. J. (2012). Terrace layout design utilizing geographic information system and automated guidance system. *Applied Engineering in Agriculture, 28*(1), 31-38.
24. Ko, J., Piccinni, G., Guo, W., & Steglich, E. (2009). Parameterization of EPIC crop model for simulation of cotton growth in South Texas. *Journal of Agricultural Science, 147*(2), 169-178.
25. Todd, R. W., Cole, N. A., Clark, R. N., Rice, W. C., & Guo, W. (2008). Soil nitrogen distribution and deposition on shortgrass prairie adjacent to a beef cattle feedyard. *Biology and Fertility of Soils, 44*(8), 1099-1102.
26. Todd, R. W., Guo, W., Stewart, B. A., & Robinson, C. (2004). Vegetation, phosphorus, and dust gradients downwind from a cattle feedyard. *Journal of Range Management, 57*(3), 291-299.
27. Meng, Q., Meng, A., Wang, J., Liu, Z., Guo, W., & Cui, M. (1998). The path analysis of main quantity characters and dry leaf yield of Stevia Rebaudiano Bertoni. *Journal of Jilin Agricultural University, 20*, 17-19.

## TEACHING

### Courses Taught (Texas Tech University)

- PSS 4340, Irrigation Management Seminar
- PSS 5323, Environmental Crop Physiology
- PSS 5329, Precision Agriculture
- PSS 6301, Quantitative Agricultural Remote Sensing
- PSS 6302, Plant Growth Modeling

### Directed Student Learning

Currently Chairs six Ph.D. students, two undergraduate research assistants, and one postdoctoral research associate at Texas Tech University. Graduated three Ph.D. and six M.S. students.

## CONTRACTS, GRANTS AND SPONSORED RESEARCH

### Selected Awards

1. Guo, W., Sheng, S., Wang, C., "Capacity Building for AI-driven Research and Education on UAS Applications in Precision Agriculture," Sponsored by USDA NIFA, $749,999. (June 1, 2023 - May 31, 2026).
2. Guo, W., Mills, C., Dodge, W., "AI-Based Assessment of Cotton Genotypes for Water Stress Resistance Using Time Series UAV Images and Environmental Data. Sponsored by Project Revolution (BASF), $275,855. (March 1, 2024 – Feb 28, 2027).
3. Guo, W., Ritchie, G., Wang, C., "Integrating a resilient cropping system and precision conservation for sustainable agriculture in a semi-arid region," Sponsored by USDA NIFA, $294,000. (March 15, 2022 - March 14, 2025).
4. Guo, W., "On-farm precision water management for sustainable agriculture in the Southern High Plains of Texas," Sponsored by Cotton Incorporated, $140,000. (January 1, 2017 - December 31, 2023).
5. Dotray, P., Guo, W., “Weed Image Repository” Sponsored by Cotton Inc. $20,000 (Jan 1, 2023-December 31, 2023).
6. Krishna, J., Ritz, R., Slaughter, L., Laza, H.E., McCallister, D., Guo, W., Alpizar, A.B., Siebecker, M. “Establishing climate smart commodities with reduced greenhouse gas footprints to enhance environmental and economic sustainability in the Texas High Plains.” Sponsored by USDA NIFA, $4,945,552. (Jan 1, 2023 – Dec 31, 2027).
7. Bratcher, C., Guo, W., McCallister, D., Singh, S., Saini, R., Williams, R., Deb, S., Wang, C., "OAP- Precipitation and Irrigation Management to Optimize Profits from Crop Production - OAP 3rd Phase with TTU," Sponsored by USDA Agricultural Research Service, $218,936. (September 2021 - August 2024).
8. Guo, W., Mills, C., "High-throughput cotton maturity phenotyping using unmanned aerial systems," Sponsored by Project Revolution (BASF), $169,864. (January 1, 2021 - December 31, 2024).
9. Helwi, P., Guo, W., "Improving Fruit Quality and Profitability by Increasing Vineyard Uniformity with Remote Sensing Coupled with Precision Viticulture," Sponsored by Texas Department of Agriculture (Texas A&M AgriLife Extension), $58,367. (December 2021 -

September 2023).

10. Guo, W., Deb, S., Lewis, K., Ritchie, G., Wang, C., "Optimizing Nitrogen Management in Dryland Cotton using Precision Agriculture Technologies in the Southern High Plains," Sponsored by Cotton Inc (TSSC), $75,000. (January 2000 - December 2022).
11. Guo, W., "Integrating Phenotyping with Cotton Growth and Development Functions," Sponsored by Cotton Inc (TSSC), $15,000. (January 31, 2022 - December 2022).
12. Guo, W., Price, K., Mills, C., Aleman-Sarinana, L., "Cotton stress assessment using multispectral and thermal sensors on unmanned aerial systems," Sponsored by Bayer - Project Revolution, $133,156. (January 1, 2019 - December 31, 2021).
13. Dever, J., T. W., Isakeit, T., Shan, L., He, P., Hague, S., Stelly, D., Monclova-Santana, C., Maeda, M., Arce, J., Flores, O., Guo, W., "Fov4 in Texas Cotton Strategic Research Initiative," Sponsored by Texas A&M AgriLife Research, $900,000. (September 1, 2019 - August 31, 2021).
14. Guo, W., "Crop Water Stress and Disease Monitoring using Remote Sensing and Smartphone Photographs," Sponsored by Monsanto, $119,508. (April 2019 - August 31, 2020).
15. Guo, W., Zhu, Z., "Quantifying Cotton Water Stress using Unmanned Aerials Systems and Satellite Remote Sensing," Sponsored by Monsanto Company, $129,999. (April 1, 2018 - May 31, 2019).

## SERVICE

Board Member, Crop and Environment (Springer Nature). (January 2022 - Present).

Editor, Guest, Remote Sensing journal, Basel. (September 2019 - May 2020).

Reviewer, Journal Article, Precision Agriculture. (September 2022 - Present).

Program Coordinator, American Society of Agronomy, San Antonio, Texas. (January 1, 2021 - December 31, 2021).

Reviewer, Journal Article, Field Crops Research. (February 2021 - March 2021).

Reviewer, Journal Article, Water (MDPI). (December 2020 - February 2021).

Reviewer, Grant Proposal, BARD, the United States - Israel Binational Agricultural

Reviewer, Journal Article, Frontiers in Plant Science. (February 2018 - May 2018).

Reviewer, European Journal of Agronomy (Elsevier). (July 2017 - December 2017).

## HONORS AND AWARDS:

2018. Program Lead of Precision Agriculture Program at Texas Tech University as one of the 25 Best Colleges for Precision Agriculture by PrecisionAg.com.

2018 Nominee, Robert Foster Cherry Award for Great Teaching. Texas Tech University.

2021. Nominee - CASNR Junior Faculty Award, Davis College of Agriculture and Natural Resources, Texas Tech University.

2024. Outstanding Research Awards. Davis College of Agriculture and Natural Resources, Texas Tech University.