# Yiqing Guo

Research Scientist
CSIRO Data61 | CSIRO AquaWatch Australia Mission
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## About Me

Hi, my name is Yiqing Guo. Currently, I am a Research Scientist at CSIRO, Australia.

I study remote sensing and machine learning, and apply these exciting techniques to agricultural, ecological and environmental problems.

I received my bachelor's and master's degrees from Beihang University, in 2012 and 2015, respectively, and my PhD degree from the University of New South Wales, Canberra Campus, in 2019, all in remote sensing.

After one and a half years of industry experience, I joined the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 2020, where I am now a Research Scientist working for CSIRO's AquaWatch Australia mission.

I have authored/co-authored more than 20 peer-reviewed publications. My research outcomes have been published in top journals such as *Remote Sens. Environ.*, *ISPRS J. Photogramm. Remote Sens.*, *IEEE Trans. Image Process.*, *IEEE Trans. Geosci. Remote Sens.*, and *IEEE Geosci. Remote Sens. Magazine*.

## Experience

2023.02 — Present **Research Scientist**
Data61, CSIRO
**Canberra, Australia**

I am a Research Scientist supported by the Dorothy Hill Fellowship at CSIRO, where I work for the AquaWatch Australia mission, striving to develop innovative solutions for water-related applications using remote sensing data and artificial intelligence methods.

2020.11 — 2023.01 **Postdoctoral Research Fellow**
Land and Water, CSIRO
**Canberra, Australia**

During my time as a Postdoctoral Research Fellow at CSIRO Land and Water (later rebranded as CSIRO Environment), I was fortunate enough to have the opportunity to work on several research projects supported by CSIRO Machine Learning and Artificial Intelligence Future Science Platform, CSIRO Space Technology Future Science Platform, and CSIRO Centre for Earth Observation.

2019.04 — 2020.10 **Data Scientist**
FluroSat, Australian National University Centre for Entrepreneurial Agri-Technology
**Canberra, Australia**

As a Data Scientist, I had the opportunity to work with FluroSat, a world-leading startup team that specialized in remote sensing technology. FluroSat was headquartered in Sydney, while its Canberra office was located at the Australian National University Centre for Entrepreneurial Agri-Technology. Today, FluroSat is recognized as Regrow Ag, a leading innovator in the field.

2018.03 — 2019.03 **Lab Demonstrator (Part Time)**
School of Engineering and IT, University of New South Wales (Canberra Campus at ADFA)
**Canberra, Australia**

I demonstrated labs for the undergraduate course Signals and Systems.

## Education

2015.11 — 2019.11 **Doctor of Philosophy in Electrical Engineering**
University of New South Wales (Canberra Campus at ADFA)
**Canberra, Australia**

Research Topic: Quantitative rice mapping with remote sensing time series
Supervisors: A/Prof. Xiuping Jia (IEEE Fellow) and Dr. David Paull
Awards: IEEE Grand Student Challenge Fund (*Only five projects worldwide are funded*) | UNSW TFS Scholarship

2012.09 — 2015.01 **Master of Engineering in Photogrammetry and Remote Sensing**
Beihang University
**Beijing, China**

Research Topic: Early detection of crop growth stress with remote sensing
Supervisor: A/Prof. Feng Zhao
Awards: Excellent Thesis | Excellent Graduate | National Scholarship

2008.09 — 2012.07 **Bachelor of Engineering in Remote Sensing**
Beihang University
**Beijing, China**

GPA: 3.6
Ranking: 3/26
Award: Excellent Graduate | National Scholarship

# Publications

**Journal Papers**

[17] Y. Guo, K. Mokany, S. R. Levick, J. Yang, and P. Moghadam (2025). Spatioformer: A Geo-Encoded Transformer for Large-Scale Plant Species Richness Prediction. IEEE Transactions on Geoscience and Remote Sensing, 63, 4403216.
[16] F. Zhao, W. Ma, J. Zhao, Y. Guo, M. Tariq, and J. Li (2024). Global reconstruction of the spectrum of terrestrial chlorophyll fluorescence: First Results With TROPOMI. Remote Sensing of Environment, 300, 113903.
[15] J. Yang, H. Zhang, Y. Guo, R. J. Donohue, T. R. McVicar, S. Ferrier, W. Müller, X. Lü, Y. Fang, X. Wang, P. B. Reich, X. Han, and K. Mokany (2023). Trajectories of plant nitrogen availability globally during 1984-2022 uncovered by satellite-derived nitrogen stable isotope ratio. Research Square: https://doi.org/10.21203/rs.3.rs-2843834/v1
[14] Y. Guo, K. Mokany, C. Ong, P. Moghadam, S. Ferrier, and S. R. Levick (2023). Plant biodiversity prediction with DESIS hyperspectral data. ISPRS Journal of Photogrammetry and Remote Sensing, 196, 120-133.
[13] Y. Guo, J. Zhang, A. Farooq, X. Chen, and X. Jia (2020). Activities of the IEEE GRSS University of New South Wales Canberra Student Chapter, Australia [Column Article]. IEEE Geoscience and Remote Sensing Magazine, 8(3), 102-103.
[12] Y. Guo, X. Jia, D. Paull, and J. A. Benediktsson (2019). Nomination-favoured opinion pool for optical-SAR-synergistic rice mapping in face of weakened flooding signals. ISPRS Journal of Photogrammetry and Remote Sensing, 155, 187–205.
[11] F. Zhao, R. Li, W. Verhoef, S. Cogliati, X. Liu, Y. Huang, Y. Guo, and J. Huang (2018). Reconstruction of the full spectrum of solar-induced chlorophyll fluorescence: Intercomparison study for a novel method. Remote Sensing of Environment, 219, 233–246.
[10] Y. Guo, X. Jia, and D. Paull (2018). Effective sequential classifier training for SVM-based multitemporal remote sensing image classification. IEEE Transactions on Image Processing, 27(6), 3036–3048.
[9] Y. Guo, X. Jia, and D. Paull (2017). Superpixel-based adaptive kernel selection for angular effect normalization of remote sensing images with kernel learning. IEEE Transactions on Geoscience and Remote Sensing, 55(8), 4262–4271.
[8] F. Zhao, X. Dai, W. Verhoef, Y. Guo, C. van der Tol, Y. Li, and Y. Huang (2016). FluorWPS: A Monte Carlo ray-tracing model to compute sun-induced chlorophyll fluorescence of three-dimensional canopy. Remote Sensing of Environment, 187, 385–399.
[7] F. Zhao, Y. Li, X. Dai, W. Verhoef, Y. Guo, H. Shang, X. Gu, Y. Huang, T. Yu, and J. Huang (2015). Simulated impact of sensor field of view and distance on field measurements of bidirectional reflectance factors for row crops. Remote Sensing of Environment, 156, 129–142.
[6] F. Zhao, Y. Guo, Y. Huang, W. Verhoef, C. van der Tol, B. Dai, L. Liu, H. Zhao, and G. Liu (2015). Quantitative estimation of fluorescence parameters for crop leaves with Bayesian inversion. Remote Sensing, 7(10), 14179–14199.
[5] F. Zhao, Y. Guo, Y. Huang, K. N. Reddy, Y. Zhao, and W. T. Molin (2015). Detection of the onset of glyphosate-induced soybean plant injury through chlorophyll fluorescence signal extraction and measurement. Journal of Applied Remote Sensing, 9(1), 097098.
[4] F. Zhao, Y. Guo, Y. Huang, K. N. Reddy, M. A. Lee, R. S. Fletcher, and S. J. Thomson (2014). Early detection of crop injury from herbicide glyphosate by leaf biochemical parameter inversion. International Journal of Applied Earth Observation and Geoinformation, 31, 78–85.
[3] F. Zhao, Y. Guo, W. Verhoef, X. Gu, L. Liu, and G. Yang (2014). A method to reconstruct solar-induced canopy fluorescence spectrum from hyperspectral measurements. Remote Sensing, 6(10), 10171–10192.

[2] F. Zhao, Y. Huang, Y. Guo, K. N. Reddy, M. A. Lee, Reginald S. Fletcher, and Steven J. Thomson (2014). Early detection of crop injury from glyphosate on soybean and cotton using plant leaf hyperspectral data. Remote Sensing, 6(2), 1538–1563.
[1] F. Zhao, X. Gu, T. Yu, W. Verhoef, Y. Guo, Y. Du, H. Shang, and H. Zhao (2013). Bidirectional reflectance effects over flat land surface from the charge-coupled device data sets of the HJ-1A and HJ-1B satellites. Journal of Applied Remote Sensing, 7(1), 073466.

**Conference Papers**

[10] Y. Guo, K. Mokany, C. Ong, P. Moghadam, S. Ferrier, and S. R. Levick (2022). Quantitative assessment of DESIS hyperspectral data for plant biodiversity estimation in Australia. In Proceedings of the 2022 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 1744-1747.
[9] Y. Guo, X. Jia, D. Paull, J. Zhang, A. Farooq, X. Chen, and M. N. Islam (2019). A drone-based sensing system to support satellite image analysis for rice farm mapping. In Proceedings of the 2019 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 9376–9379.
[8] Y. Guo, X. Jia, and D. Paull (2018). Mapping of rice varieties with Sentinel-2 data via deep CNN learning in spectral and time domains. In Proceedings of the 2018 International Conference on Digital Image Computing: Techniques and Applications (DICTA), 794–800.
[7] Y. Guo, X. Jia, and D. Paull (2017). Sequential classifier training for rice mapping with multitemporal remote sensing imagery. In ISPRS Annals of Photogrammetry, Remote Sensing & Spatial Information Sciences, 4, 161–165.
[6] Y. Guo, X. Jia, and D. Paull (2017). A domain-transfer support vector machine for multi-temporal remote sensing imagery classification. In Proceedings of the 2017 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 2215–2218.
[5] Y. Guo, X. Jia, and D. Paull (2016). Multi-kernel retrieval of land surface bidirectional reflectance distribution functions based on l1-norm optimization. In Proceedings of the 2016 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 1358–1361.
[4] Y. Guo, F. Zhao, Y. Huang, K. N. Reddy, Y. Zhao, and L. Dong (2014). Detection of the onset of crop stress induced by glyphosate using chlorophyll fluorescence measurements. In Proceedings of the Third International Conference on Agro-Geoinformatics, 560–564. **Best Student Paper Award**
[3] Y. Guo, F. Zhao, Y. Huang, M. A. Lee, K. N. Reddy, R. S. Fletcher, S. J. Thomson, and J. Huang (2013). Early detection of crop injury from glyphosate by foliar biochemical parameter inversion through leaf reflectance measurement. In Proceedings of the Second International Conference on Agro-Geoinformatics, 116–120.
[2] E. Madigan, Y. Guo, M. Pickering, A. Held, and X. Jia (2018). Quantitative monitoring of complete rice growing seasons using Sentinel 2 time series images. In Proceedings of the 2018 IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 7699–7702.
[1] P. Zhang, F. Zhao, Y. Guo, Y. Zhao, L. Dong, and H. Zhao (2014). Sensitivity analysis of the row model's input parameters. In Proceedings of the Third International Conference on Agro-Geoinformatics, 220–224.

**Technical Reports**

[1] Lau, Ian; Ong, Cindy; Guo, Yiqing; Caccetta, Mike. A 10-Year Analysis of Landsat 8 Continental Imagery to Identify Candidate Sites for Optical Vicarious Calibration and Validation in Australia. Australia: CSIRO; 2023. csiro:EP2023-5606. https://doi.org/10.25919/dxg8-8w19

**Open Source Codes**

[4] Y. Guo, K. Mokany, S. R. Levick, J. Yang, and P. Moghadam (2025). Spatioformer. https://github.com/csiro-robotics/Spatioformer

[3] Yang, Jinyan; Zhang, Haiyang; Guo, Yiqing; Donohue, Randall; McVicar, Tim; Ferrier, Simon; Muller, Warren; Lv, Xiaotao; Fang, Yunting; Wang, Xiaoguang; Reich, Peter; Han, Xingguo; & Mokany, Karel (2024): A framework to estimate nitrogen stable isotope ratio from satellite spectra. CSIRO. v1. Software. https://doi.org/10.25919/6ahe-e170

[2] Yang, Jinyan; Guo, Yiqing; Owers, Chris; Giljohann, Kate; Valavi, Roozbeh; Donohue, Randall; Williams, Kristen; Ferrier, Simon; & Mokany, Karel (2024): FACTE: A framework for dynamic assessments of terrestrial ecosystem condition. CSIRO. v1. Software. https://doi.org/10.25919/e6gt-hd02

[1] Yiqing Guo, Xiuping Jia, David Paull (2018) TASVM: A domain-transfer support vector machine for classifier-level domain adaptation [Source Code]. https://doi.org/10.24433/CO.9d860e02-91b0-4a6a-850d-d4f52754ca33

**Published Datasets**

[4] Guo, Yiqing; Mokany, Karel; Levick, Shaun; Yang, Jinyan; & Moghadam, Peyman (2024): AusRichness: A machine learning ready dataset for plant species richness prediction in Australia. v1. CSIRO. Data Collection. https://doi.org/10.25919/7d5h-yp05

[3] Yang, Jinyan; Guo, Yiqing; Owers, Chris; Giljohann, Kate; Valavi, Roozbeh; Donohue, Randall; Williams, Kristen; Ferrier, Simon; & Mokany, Karel (2024): Annual terrestrial ecosystem condition score map for Australia derived using the FACTE framework: 100m, 2013-2022. v1. CSIRO. Data Collection. https://doi.org/10.25919/k5cv-ss32

[2] Yang, Jinyan; Zhang, Haiyang; Guo, Yiqing; Donohue, Randall; McVicar, Tim; Ferrier, Simon; Muller, Warren; Lv, Xiaotao; Fang, Yunting; Wang, Xiaoguang; Reich, Peter; Han, Xingguo; & Mokany, Karel (2024): Global terrestrial plant nitrogen stable isotope ratio samples: 30m centroid of each 0.1 degree grid cell from 1984 to 2022. v1. CSIRO. Data Collection. https://doi.org/10.25919/7069-6855

[1] Lau, Ian; Ong, Cindy; Guo, Yiqing; Caccetta, Mike; Squire, Geoffrey; & Woodcock, Robert (2023): Landsat 8 Continental Analysis of Australia. v1. CSIRO. Data Collection. https://doi.org/10.25919/25p4-5r08

**Theses**

[2] Y. Guo (2019). Quantitative rice mapping with remote sensing image time series. PhD Thesis. The University of New South Wales.

[1] Y. Guo (2015). Early detection of crop stress with hyperspectral remote sensing data. Master's Thesis. Beihang University [In Chinese]. **Excellent Thesis Award**

**Granted Patents**

[2] F. Zhao and Y. Guo (2014). A method for spectral feature extraction from hyperspectral reflectance data based on global sensitivity analysis. Patent Grant No.: CN103714341A

[1] F. Zhang, Y. Guo, P. Zhang, Y. Zhao, and H. Zhao (2014). A method for retrieval of field component temperature based on global optimization algorithm. Patent Grant No.: CN103823994A

## Grant

2018 — 2019 US$6000. Y. Guo, et al., A Drone-Based Rice Monitoring System to Support Intelligent Farm Management, IEEE Geoscience and Remote Sensing Society Grand Student Challenge.

## Services

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| 2024 — Present | **Chair**, IEEE GRSS Australian Capital Territory and New South Wales Joint Chapter |
| 2024 — Present | **Executive Board Member**, IEEE Australian Capital Territory Section |
| 2023 | **Track Chair**, Geoscience and Remote Sensing, TENSYMP2023 |
| 2018 — 2019 | **Inaugural Chair**, IEEE GRSS University of New South Wales Canberra Student Chapter (*This is the first IEEE GRSS Student Chapter in Australia*) [*Find out more*] |
| 2018 — 2019 | **Executive Board Member**, IEEE Australian Capital Territory Section |