RUI GAO

Postdoctoral Researcher
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I. EDUCATION

Ph.D. 2023 Utah State University, Logan, Utah, the United States. Civil and Environmental Engineering.
M.S. 2017 Xinjiang Agricultural University, Urumqi, China. Hydraulic and Civil Engineering.
B.S. 2014 Xinjiang Agricultural University, Urumqi, China. Hydraulic and Civil Engineering.
Visiting scholar 2012 Hohai University, Nanjing, China. Hydrology and Water Resources.

II. RESEARCH

Academic experience

2023 – present: Post-doc Fellow, Department of Forestry, Mississippi State University, Starkville, MS, USA.
2018 – 2023: Graduate Research Assistant, Department of Civil & Environmental Engineering, Utah State University, Logan, UT, USA.
2014 – 2017: Graduate Research Assistant, Department of Hydraulic & Civil Engineering, Xinjiang Agricultural University, Urumqi, China.

Peer reviewed publications

1. **Gao R,** Alsina MM, Torres-Rua AF, Hipps L, Kustas W, Anderson M, Nieto H, McElrone A, Knipper K, Bambach N, Castro S, Prueger J, Alfieri J, McKee L, White A, Gao F, Coopmans C, Gowing I, Agam N, Sanchez L, Dokoozlian N, Yang Y. Integrating sUAS and time-series meteorological data for leaf and stem water potential assessment via machine learning approach in California vineyards. Under reviewing.
2. Li Z, Mu Z, **Gao R.** Applicability of ERA5 reanalysis precipitation data in runoff modeling in the Ili River Basin. Under reviewing.
3. Meza K, Torres-Rua AF, Hipps L, Kustas WP, **Gao R,** Christiansen L, Kopp K, Nieto H, Burchard-Levine V, Martín MP, Coopmans C. Spatial estimation of actual evapotranspiration over irrigated turfgrass using sUAS thermal and multispectral imagery and TSEB model. *Irrigation Science*. 2023 Dec 6:1-24.
4. **Gao R,** Torres-Rua AF, Nieto H, Zahn E, Hipps L, Kustas WP, Alsina MM, Bambach N, Castro SJ, Prueger JH, Alfieri J. ET Partitioning Assessment Using the TSEB Model and sUAS Information across California Central Valley Vineyards. Remote Sensing. 2023 Jan 28;15(3):756.
5. **Gao R,** Torres-Rua AF, Aboutalebi M, White WA, Anderson M, Kustas WP, Agam N, Alsina MM, Alfieri J, Hipps L, Dokoozlian N. LAI estimation across California vineyards using sUAS multi-seasonal multi-spectral, thermal, and elevation information and machine learning. *Irrigation Science*. 2022 Sep;40(4-5):731-59.
6. Zhou Y, Mu Z, Peng L, **Gao R,** Yin Z, Tang R. Mid-term and Long-term Hydrological Forecasting of Snowmelt Runoff in Western Tianshan Mountains Based on Mutual Information and Neural Network. *Journal of Yangtze River Scientific Research Institute*. 2018; *35*(8), 17.
7. Zhou Y, Mu Z, Peng L, **Gao R,** Yin Z, Tang R. Medium and long-term hydrological forecasting of snowmelt runoff in the western Tianshan mountains based on mutual information and neural network. *Journal of Changjiang River Scientific Research Instituete*. 2018; 35(8), 17.

8. **Gao R,** Mu Z, Peng L, Zhou Y, Yin Z, Tang R. Application of CFSR data under different correction methods in runoff simulation in Western Tianshan mountains. Chinese Journal of Agrometeorology. 2017 Jun 20; 38(06): 342.
9. **Gao R,** Mu Z, Peng L, Zhou Y, Yin Z, Tang R. Application of CFSR and ERA-interim reanalysis data in runoff simulation in high cold Alpine areas. *Water Resoures and Power*. 2017; 35, 8-12.
10. **Gao R,** Mu Z, Application of VIC model in western Tianshan mountains. *South-to-North Water Transfers and Water Science & Technology*. 2017; 15(4), 44-48.
11. **Gao R,** Mu Z, Peng L, Zhou Y, Yin Z, Tang R. Application of CFSR data under different correction methods in runoff simulation in Western Tianshan mountains. *Chinese Journal of Agrometeorology*. 2017; 38(06), 342.
12. Yin Z, Mu Z, **Gao R,** Zhou Y, Tang R. Application of HBV hydrology model of consideration glacier in west Tianshan. *Journal of Hydroelectric Engineering*. 2017; 36(11), 42-49.

Conference publications

1. **Gao R,** Alsina MM, Torres-Rua AF, Hipps L, Kustas WP, White WA, Anderson M, Alfieri J, Dokoozlian N, Nieto H, Gao F. Exploratory analysis of vineyard leaf water potential against UAS multispectral and temperature information. In Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VII 2022 Jun 3 (Vol. 12114, pp. 160-185). SPIE.\
2. **Gao R,** Torres-Rua AF, Hipps L, Kustas WP, Anderson M, White WA, Alfieri JG, Alsina MM, Dokoozlian N, Nieto H, Gao F. Assessment of TSEB-PT and-2T in ET partitioning estimation over California commercial vineyards based on sUAS information. In Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VII 2022 May 30 (Vol. 12114, p. 121140I). SPIE.
3. Nassar A, Torres-Rua A, Merwade V, Dey S, Zhao L, Kim IL, Kustas WP, Nieto H, Hipps L, **Gao R,** Alfieri J. Development of high-performance computing tools for estimation of high-resolution surface energy balance products using sUAS information. In Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VI 2021 Apr 12 (Vol. 11747, pp. 89-97). SPIE.
4. **Gao R,** Torres-Rua A, Nassar A, Alfieri J, Aboutalebi M, Hipps L, Ortiz NB, McElrone AJ, Coopmans C, Kustas W, White W. Evapotranspiration partitioning assessment using a machine-learning-based leaf area index and the two-source energy balance model with sUAV information. In Autonomous Air and Ground Sensing Systems for Agricultural Optimization and Phenotyping VI 2021 Apr 12 (Vol. 11747, pp. 106-129). SPIE.

Conference poster

1. **Gao R,** Yang Y, Knipper K, Alsina MM, Sanchez L, Melton F, Nieto H, Bambach N, Gao F, Alfieri J, Anderson M, Kustas W, Hipps L, Torres-Rua AF. Estimating 3-m evapotranspiration data using Planet and OpenET data with machine leanring techniques. In the 104th AMS Annual Meeting 2024 Jan (Vol. 2024, pp. V27C-38HYDRO)
2. **Gao R,** Alsina MM, Torres-Rua AF, Hipps L, Kustas W, Anderson M, Nieto H, McElrone A, Knipper K, Bambach N, Sebastian C, Prueger J, Alfieri J, McKee L, White W, Gao F, Coopmans C, Agam N, Sanchez L, Dokoozlian N, Yang Y. Utilizing sUAS and time-series weather data with machine learning for leaf and stem water potential assessment in California vineyards. In AGU Fall Meeting Abstracts 2023 Dec (Vol. 2023, pp. B53H-1990)
3. Kustas W, Nieto H, Zahn E, Bambach N, Gao F, McElrone A, Burchard-Levine V, Knipper K, Torres-Rua AF, **Gao R,** Prueger J, Alfieri J, McKee L, Castro S, Anderson M, Alsina MM, Bou-Zeid E. Evaluating Evapotranspiration Partitioning into Soil Evaporation and Plant Transpiration in

Vineyards with Thermal Remote Sensing. In the 104th AMS Annual Meeting 2023 Jan (Vol. 2023, pp. 13B.1)

4. **Gao R,** Torres-Rua AF, Alsina MM, Nieto H, Hipps L, Kustas W, White A, Anderson M, Alfieri J, Dokoozlian N, Gao F, McKee L, Prueger J, Sanchez L, McElrone A, Bambach N, Coopmans C, Gowing I. ET partition-based grapevine water stress estimation based on small unmanned aerial systems and the two-source energy balance model. In AGU Fall Meeting Abstract 2022 Dec (Vol. 2022, pp. H55A-08).
5. Meza K, Torres-Rua AF, Hipps L, Kustas W, Kopp K, **Gao R,** Christiansen L, Hargreaves O, Osorio K, Gowing I, Coopmans C. Estimation of leaf area index in urban turfgrass using high-resolution multispectral imagery for the two-source energy balance model. In AGU Fall Meeting Abstracts 2022 Dec (Vol. 2022, pp. H55A-07).
6. Torres-Rua AF, **Gao R,** Meza K, Duran M, Nocco M, Bambach N, Hipps L, McElrone A, Kustas W, Nieto H, Prueger J, Knipper K, Gowing I, Coopmans C. Influence of UAV commercial thermal sensor characteristics on almond evapotranspiration. In AGU Fall Meeting Abstracts 2022 Dec (Vol. 2022, pp. H46E-02).
7. **Gao R,** Nassar A, Aboutalebi M, Torres-Rua AF, Prueger JH, McKee L, Alfieri JG, Hipps L, Nieto H, White WA, Alsina MM. Grapevine leaf area index estimation with machine learning and unmanned aerial vehicle information. In AGU Fall Meeting Abstracts 2020 Dec (Vol. 2020, pp. H008-0012).
8. **Gao R,** Zeng R. Detecting agricultural drainage ditch system in low relief land: a heterogeneous filtering approach. In AGU Fall Meeting Abstracts 2019 Dec (Vol. 2019, pp. H11I-1586).

Research repository

1. **Gao R,** Torres-Rua AF. Feature extraction from the high-resolution AggieAir images for leaf water potential and stem water potential estimation in California vineyards. CUAHSI HydroShare. 2024. Pending.
2. **Gao R,** Torres-Rua AF. California grapevine leaf and stem water potential mapping based on a machine learning approach via ArcGIS API for Python. CUAHSI HydroShare. 2024. Pending.
3. **Gao R,** Torres-Rua AF. Temperature separation via eliminating shadow-pixel influence based on high-resolution sUAS image in California vineyards. CUAHSI HydroShare. 2023.
4. **Gao R,** Torres-Rua AF. A python-based program generating a part of information based on AggieAir images for the TSEB model: taking California vineyards as an example. CUAHSI HydroShare. 2022.
5. **Gao R,** Torres-Rua AF. Features extraction from the LAI2200C plant canopy analyzer. CUAHSI HydroShare. 2021
6. **Gao R,** Torres-Rua AF, Nassar A, Hipps L, Nieto H, Aboutalebi M, White W, Anderson M, Kustas W, Alsina MM, Alfieri J, Dokoozlian N, Gao F, McKee L, Prueger J, Sanchez L, McElrone A, Bambach N, Gowing I, Coopmans C. TSEB modeling and the comparison between the model results and the eddy-covariance monitored data within the footprint area. CUAHSI Hydroshare. 2021
7. **Gao R,** Nassar A, Torres-Rua AF, Hipps L, Aboutalebi M, White WA, Anderson M, Kustas WP, Alsina MM, Alfieri J. Footprint area generating based on eddy covariance records. CUAHSI HydroShare. 2021.
8. **Gao R,** Torres-Rua AF, Nassar A, Hipps L, Nieto H, Aboutalebi M, White W, Anderson M, Kustas W, Alsina MM, Alfieri J, Dokoozlian N, Gao F, McKee L, Prueger J, Sanchez L, McElrone A, Bambach N, Gowing I, Coopmans C. Feature extraction approaches for leaf area index estimation in California vineyards via machine learning algorithms. CUAHSI HydroShare. 2021.

Other involved presentation

1. Water-use and land-cover change detection using ECOSTRESS and OpenET. San Francisco, LA, United States. October 2023. ECOSTRESS.

2. Integrating sUAS and eddy-covariance data for accurate vine stem water potential assessment at the vineyard scale. Logan, UT, United State. April 2023. Utah State University Spring Runoff Conference.
3. Spatial estimation of actual evapotranspiration and turfgrass quality on golf courses using remote sensing information. St. Louis, MO, United States. October 2023 ASA-CSSA-SSSA International Annual Meeting.
4. Implementing the use of thermal imagery for vine water status monitoring in commercial vineyards, scalability of the method from UAV to Landsat level. January 2023. Stellenbosch, South Africa. International Society for Horticultural Science.
5. Evaluating evapotranspiration partitioning into soil evaporation and plant transpiration in vineyards with thermal remote sensing. Denver, CO, United States. January 2022. At the 103rd American Meteorological Society Annual Meeting.
6. Estimation of Evapotranspiration over Urban Turfgrass Using Eddy Covariance Flux Measurements and Remote Sensing-Based Models. Pellston, MI, United States. September 2022. In the 2022 AmeriFlux Annual Meeting.
7. Estimation of evapotranspiration over urban turfgrass using eddy measurements and remote sensing-based models. New Orleans, LA, United States. April 2022. Computing Research Association Widening Participation (CRA-WP).
8. Estimation of crop water consumption for Utah crops using soil moisture sensors information. Logan, UT, United States. March 2022. Utah State University Spring Runoff Conference.
9. Comparison of consumptive water use methodologies at farm scale using ground and remote sensing information in Modena. Logan, UT, United States. March 2022. Utah State University Spring Runoff Conference.
10. Evapotranspiration of urban turfgrass using eddy covariance measurements and remote sensing-based models. Logan, UT, United States. March 2022. Utah State University Spring Runoff Conference
11. Determining almond tree water use and stress using surface energy balance models with unmanned aircraft systems. Davis, CA, United States. February 2022. Tree crop Remote sensing of Evapotranspiration eXperiment (TREX).
12. Detecting Agricultural Drainage Ditch System in Low Relief Land Using High-Resolution LiDAR Terrain Data. Snowbird, UT, United States. June 2019. In the University Council on Water Resources (UCOWR).

III. SOCIAL

Awards and honors

2023, Champion in the Mixed Doubles Table Tennis, Starkville Chinese Christian Church, Starkville, MS, USA.
2022, The Third Place in Research Presentation Organized by the Chinese Association for Science & Technology (CAST-UT), Salt Lake City, UT, USA.
2021, Runner Up of Best Student Paper Award. SPIE conference.
2020, Student Travel Grants. Utah State University. Logan, UT, USA.
2019, Student Travel Grants. Utah State University. Logan, UT, USA.
2017, Outstanding Graduate Student Award. Xinjiang Agricultural University. Urumqi, Xinjiang, China.
2016, Runner Up of Best Student Paper Award. The third Xinjiang Agricultural University Graduate Academic Formula. Xinjiang Agricultural University. Urumqi, Xinjiang, China.
2016, The 3rd Place in the Eighth Xinjiang Graduate Students' Academic Forum. Shihezi University. Shihezi, Xinjiang, China.
2015, The 3rd Place in the 3rd Xinjiang Agricultural University Culture & Arts Festival, Xinjiang Agricultural University, Urumqi, Xinjiang, China.

2014, Xinjiang Agricultural University Graduate Student Basketball Member, Xinjiang-University Basketball Matches (Urumqi area). Champion. Urumqi, Xinjiang, China.
2014, Basketball Team Leader in the Department of Hydraulic and Civil Engineering for the Xinjiang Agricultural University Graduate Student Basketball Matches. Runner-up. Urumqi, Xinjiang, China.
2014, Outstanding Graduate Student Award. Xinjiang Agricultural University. Urumqi, Xinjiang, China.

Membership in scientific societies

American Geophysical Union (AGU), 2018 - current.
Chinese Association for Science & Technology (CAST-UT), 2022.
American Society of Civil Engineers (ASCE), 2018.
Universities Council on Water Resources (UCOWR), 2019.
International Society for Optical and Photonics (SPIE), 2020 - 2022.
American Meteorological Society (AMS), 2023 - current.

Professional services

Jan 2024 – present	Reviewer for Agricultural Water Management.
Oct 2023 – present	Reviewer for Papers in Applied Geography.
Oct 2023 – present	Reviewer for Frontiers in Plant Science.
Sep 2023 – present	Reviewer for Earth System Science Data.
Aug 2023 – present	Reviewer for Remote Sensing Applications: Society and Environment.
Nov 2022 – present	Reviewer for Remote Sensing of Environment.

Other services

2024 – present	Mississippi State University Community Band, Alto Saxophone, Mississippi State University, Starkville, MS, USA.
2023 – present	Starkville Chinese Christian Church, Starkville, MS, USA.
2018 – 2023	Logan Chinese Baptist Church, Logan, UT, USA.
2014 – 2017	Student Council President in the Department of Hydraulic and Civil Engineering, Xinjiang Agricultural University, Urumqi, Xinjiang, China.
2010 – 2014	Student Council Member in the Department of Hydraulic and Civil Engineering, Xinjiang Agricultural University, Urumqi, Xinjiang, China.

IV. TEACHING

2023 FO-4313-6313 | NREC-4313 - Spatial technologies in natural resources management at MSU (Guest speaker).

2022 CEE 5190/6190 - GIS for Civil Engineering at USU (Guest speaker and teaching assistant). https://github.com/RuiGao9/CEE6190_GIS_Hillshade
Comments from students:

- Regarding instructor goals/intentions:

"I really enjoyed how you laid out the goal of the presentation and reflected it to solving a common problem."

- Regarding clarity, organization, and information load:

(1) "I felt the information was easy to understand, but I think the information felt a little bit too technical for our purpose in this class." (2) "The PowerPoint was clear and easy to follow. He made sure to stop and see if we understood." (3) "The slideshow was legible and clear in the procedure."

- Regarding teacher/student interactions:

(1) "I feel that Rui tied together the presentation ideas really well, and made it reasonable for the students in the class." (2) "Very fun interacting with the class. Made it entertaining!"

- Regarding language:
(1) "I felt like Rui was very easy to understand. There wasn't very much from his presentation that I didn't understand." (2) "The English was not perfect, but the meaning and intent was always clear." (3) "The language was a minor barrier, and the accent required more brain power to follow along with, but he was able to find a way to clarify his explanations every time."
- Additional comments:
(1) "I thoroughly enjoyed Rui's presentation and found it to be informative and easy to understand." (2) "Thank you for the candy and I liked the explanation of environments. I like that it was lighthearted and fun." (3) "Good use of humor."

2022 PSC 6003 / CEE 6003 - Remote sensing of land surfaces at USU (Teaching assistant)
https://github.com/RuiGao9/PSC6003-CEE6003_Practice_Material

2021 CEE 5190/6190 - GIS for Civil Engineering at USU (Guest speaker and teaching assistant).