Yanhua Xie, Ph.D.

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Department of Geography and Environmental Sustainability
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RESEARCH INTERESTS

Remote Sensing, Irrigation, Urbanization, Urban-agriculture Conflicts, Land Use/Cover Change, Machine Learning, Cloud Computing

EDUCATION

- **Ph.D.**, Spatial & Earth Sciences, Indiana State University, Aug. 2017
  Focus: Urban land use, energy consumption, nighttime light remote sensing
  Advisor: Dr. Qihao Weng
- **M.E.**, Electronics and Communication Engineering, Chinese Academy of Sciences, Jul. 2013
  Focus: Remote sensing, sensor calibration, urban land use
  Advisor: Dr. Tao Yu
- **B.S.**, Geographic Information System, Southwest University, Chongqing, China, Jul. 2010

PROFESSIONAL EXPERIENCE

- **Assistant Professor**, DGES, University of Oklahoma, Aug. 2023 – current
- **Scientist**, SAGE, University of Wisconsin-Madison, Apr. 2022 – Aug. 2023
  Focus: Agricultural irrigation, urban-agr water use conflicts
- **Postdoc**, SAGE, University of Wisconsin-Madison, Nov. 2017 – Mar. 2022
  Focus: Agricultural irrigation, urban-agr land use conflicts
- **Doctoral Research Assistant**, Indiana State University, Aug. 2013 – Aug. 2017
  Focus: Develop geospatial methods to monitor urban land/energy use dynamics at the global level as well as case studies in US and China

AWARDS AND HONORS

- Best Reviewer for Remote Sensing of Environment in 2021
- IndianaView Student Scholarship, 2016 & 2017
- Graduate Student Research Fund, Indiana State University, 2014, 2015, 2016 & 2017

- Best Student Paper Award (First Place), EORSA 2016, Jul. 2016
- Benjamin Moulton Geography Scholarship, Indiana State University, 2015 & 2016
- Excellent graduate, Southwest University, Apr. 2010

TEACHING/MENTORING EXPERIENCE

1. **Guest Lecturer**, Department of Geography, UW-Madison, Feb. 2020-2023
(1) <u>Geog 309 - People, Land, and Food</u> (undergraduate, 80 students)
2. **Teaching Assistant**, Department of Earth and Environmental Systems, Indiana State University, Aug. 2014 - May 2015 & Aug. 2016 - May 2017
(1) <u>ENVI 110 - Intro to Envi Science</u> (undergraduate, 30 students/section, 2 sections/semester)
(2) <u>ENVI 407/507 - Remote Sensing: Digital Analysis</u> (undergraduate/graduate level, 4 students)
(3) <u>ENVI 450/550 - Envi Modeling & Mapping</u> (undergraduate/graduate level, 5 students)
3. **Mentoring**
(1) <u>Sara Lloyd Rider</u>, B.A. student, University of Wisconsin-Madison, May – current 2022
(2) <u>Justin Brandt & Donald Martin</u>, geographers, USGS CA Water Science Center, Feb 2021 – June 2022
(3) <u>Joel McClure</u>, B.A. student, University of Wisconsin-Madison (May – Nov 2019)

PROJECTS AND GRANTS

- NASA, "Quantifying the compound effects of urbanization over irrigated croplands on neighborhood heat stress" (PI, Pending)
- NASA, "Quantifying the dynamics of agricultural irrigation practices using CSDA data"; Co-PI/UW leader of the project, PI: Xiaohui Yuan, Uni. of North Texas. (Pending)
- NASA, "Multi-Source Imaging of Long-Term Irrigation Status and Type Changes in the Mississippi Alluvial Valley"; Co-PI/UW leader of the project, PI: Lu Liang, Uni. of North Texas. Total budget: $450,000, 2022-2025.
- U.S. Geological Survey, "Mapping field-level irrigation system type and trends to enable improved agricultural water use estimation across the United States"; Co-PI/Lead the project, PI: Tyler Lark, UW Madison. Total budget: $435,000, 2022-2025.
- U.S. Geological Survey, "A Data-Driven Approach to Water Source Identification"; Collaborator, PI: Landon Marston, Virginia Tech. Total budget: ~$150,000, 2022-2024.
- Environmental Defense Fund, "Right-sizing expectations of soil carbon sequestration from conservation practices on US croplands"; Collaborator, PI: Tyler Lark, UW Madison. Total budget: $289,376, 2022-2024.
- American Farmland Trust Grant, "Cropland under threat stressed by future urban development and climate change, 2020-2040"; Co-PI/co-leader of the project, PI: Tyler Lark,

UW Madison. Total budget: $67,000, 2021-2022.

- U.S. Geological Survey, "Mapping annual irrigation extent at 30-m resolution across the United States, 1997-2017"; Co-PI/co-leader of the project, PI: Tyler Lark, UW Madison. Total budget: $140,000, 2019-2020.
- Great Lakes Bioenergy Research Center Award from DOE, "Multi-scale modeling of bioenergy production potential of marginal lands"; Co-PIs: Holly Gibbs and Tyler Lark, UW Madison. Total budget: $720,000, 2017–2022. My role: lead method development of satellite-based cropland abandonment mapping.
- National Wildlife Federation, "Impacts of the renewable fuel standard on America's land and water resources"; PI: Holly Gibbs and Tyler Lark, UW Madison. Total budget: $544,500, 2017-2018. My role: lead method development of satellite-based irrigation mapping in 2012.
- IndianaView Student Scholarship Program, "An exploration of the spatiotemporal variations of nighttime light intensity in Indiana"; PI, Advisor: Qihao Weng, Indiana State University. Total budget: $1,500, 2017.
- IndianaView Internal Grant Program, "Building type identification using high-resolution imagery and LiDAR data"; PI, Advisor: Qihao Weng, Indiana State University. Total budget: $1,500, 2016.

PUBLICATIONS

Under review & in preparation

2. **Xie, Y.**, Lark, T.J., Spawn-Lee, S., Yin, H., and Radeloff V. C., (Under review). "U.S. Croplands abandoned between 1986-2018: spatiotemporal patterns and current land uses"
1. **Xie, Y.**, Lark, T.J., Yin, H., Radeloff V. C., and Gibbs, H.K., (In preparation). "Urbanization-induced cropland abandonment across the U.S."

Peer-reviewed journal articles

24 **Xie, Y.**, Hunter, M., Sorensen, A., Nogeire-McRae, T., Murphy, R., Suraci, J.P., Lischka, S., Lark, T.J., 2023. U.S. Farmland under Threat of Urbanization: Future Development Scenarios to 2040. Land, 12, 574. doi: 10.3390/land12030574

23 Luo, K., Lu, L., **Xie, Y.**, Chen, F., Yin, F., & Li, Q., 2023. "Crop type mapping in the central part of the North China Plain using Sentinel-2 time series and machine learning." *Computers and Electronics in Agriculture*, 205, 107577.

22. Aung T., Qverland I., Vakulchuk R., and **Xie Y.**, 2022. "The environmental burden of special economic zones on the coastal and marine environment: A remote sensing assessment in Myanmar." *Environmental Research Applications: Society and Environment*, 100809. doi: 10.1016/j.rsase.2022.100809

21. Zhang, C., Dong, J., **Xie, Y.**, Zhang, X., and Ge, Q., 2022. "Mapping irrigated croplands in

China using a synergetic training sample generating method, machine learning classifier, and Google Earth Engine." *International Journal of Applied Earth Observation and Geoinformation,* 112, 102888. doi: 10.1016/j.jag.2022.102888

20. Yang, J., Shi, Q., Menenti, M., **Xie, Y.**, Wu, Z., Xu, Y. and Abbas, S., 2022. "Characterizing the thermal effects of vegetation on urban surface temperature." Urban Climate, 44, p.101204. doi: 10.1016/j.uclim.2022.101204

19. Chen W., Zhou Y., **Xie Y.**, Chen G., Ding K. J., & Li D., 2022. Estimating spatial and temporal patterns of urban building anthropogenic heat using a bottom-up city building heat emission model. Resources, Conservation and Recycling, 177, 105996.

18. **Xie Y.**, Gibbs H., and Lark T.J., 2021. "LANID-US: annual 30-m resolution irrigation maps for the conterminous United States, 1997-2017." *Earth System Science Data*, 13(12), 5689-5710. doi: 10.5194/essd-13-5689-2021

17. **Xie Y.** and Lark T.J., 2021. " Mapping annual irrigation from Landsat imagery and environmental variables across the conterminous United States." *Remote Sensing of Environment*, 260, 1-17. doi: 10.1016/j.rse.2021.112445

16. Fu, H., Shao, Z., Fu, P., Zhan, W., **Xie, Y.**, & Cheng, T. (2021). "Reconciling the inconsistency of annual temperature cycles modelled from Landsat and MODIS LSTs through a percentile approach. " *International Journal of Remote Sensing*, 42(20), 7907-7930.

15. Ren J., Shao Y., Wan H., and **Xie Y.**, 2021. "A two-step mapping of irrigated corn with multi-temporal MODIS and Landsat Analysis Ready Data." *ISPRS Journal of Photogrammetry and Remote Sensing*, 176, 69-82, doi: 10.1016/j.isprsjprs.2021.04.007.

14. Aung T., Qverland I., Vakulchuk R., and **Xie Y.**, 2021. "Using satellite data and machine learning to study conflict-induced environmental and socioeconomic destruction in data-poor areas: The case of the Rakhine conflict." *Environmental Research Communications*, 3(2), 025005.

13. Yin H., …, **Xie Y.**, & Radeloff V. C., 2020. "Monitoring cropland abandonment with Landsat time series". *Remote Sensing of Environment*, 246, 111873. doi:10.1016/j.rse.2020.111873

12. **Xie Y.**, Lark T. J., Brown J. F., & Gibbs H. K., 2019. "Mapping irrigated cropland extent across the conterminous United States at 30 m resolution using a semi-automatic training approach on Google Earth Engine." *ISPRS Journal of Photogrammetry and Remote Sensing*, 155, 136-149. doi:10.1016/j.isprsjprs.2019.07.005

11. **Xie Y.**, Weng Q., and Fu P., 2019. "Temporal variations of artificial nighttime lights and their implications for urbanization in the conterminous United States, 2013–2017." *Remote Sensing of Environment*, 225: 160-174. doi: 10.1016/j.rse.2019.03.008

10. Lu L., Weng Q., **Xie Y.**, Guo H., & Li Q., 2019. "An assessment of global electric power consumption using the Defense Meteorological Satellite Program-Operational Linescan System nighttime light imagery." *Energy*, 189, 116351. doi:10.1016/j.energy.2019.116351

9. Fu P., **Xie Y.**, Moore C. E., Myint S. W., & Bernacchi C. J., 2019. "A comparative analysis of anthropogenic CO2 emissions at city level using OCO-2 observations: A global perspective." *Earth's Future*.

8. Fu P., **Xie Y.**, Weng Q., Myint S., Meacham-Hensold K., & Bernacchi C., 2019. "A physical model-based method for retrieving urban land surface temperatures under cloudy conditions." *Remote Sensing of Environment*, 230, 111191. doi:10.1016/j.rse.2019.05.010

7. Zou, Y., Peng, H., Liu, G., Yang, K., **Xie, Y.**, & Weng, Q., 2017. "Monitoring urban clusters expansion in the middle reaches of the Yangtze River, China, using time-series nighttime light images." *Remote Sensing*, 9(10), 1007.

6. **Xie Y.** and Weng Q., 2017. "Spatiotemporally enhancing time-series DMSP/OLS nighttime lights for mapping large-scale urban dynamics." *ISPRS Journal of Photogrammetry and Remote Sensing* 128: 1-15. doi: 10.1016/j.isprsjprs.2017.03.003

5. **Xie Y.** and Weng Q., 2016. "Updating urban extents with nighttime light imagery by using an object-based thresholding method." *Remote Sensing of Environment* 187: 1-13. doi: 10.1016/j.rse.2016.10.002

4. **Xie Y.** and Weng Q., 2016. "Detecting urban-scale dynamics of electricity consumption at Chinese cities using time-series DMSP-OLS nighttime light imageries." *Energy* 100: 177-189. doi: 10.1016/j.energy.2016.01.058

3. **Xie Y.** and Weng Q., 2016. "World energy consumption pattern as revealed by DMSP-OLS nighttime light imagery." *GIScience & Remote Sensing*: 1-18. doi: 10.1080/15481603.2015.1124488

2. Li Q., Lu L., Weng Q., **Xie Y.**, and Guo H., 2016. "Monitoring Urban Dynamics in the Southeast USA Using Time-Series DMSP/OLS Nightlight Imagery." *Remote Sensing* 8.7: 578. doi: 10.3390/rs8070578

1. **Xie Y.**, Weng A., and Weng Q., 2015. "Population Estimation of Urban Residential Communities Using Remotely Sensed Morphologic Data." *Geoscience and Remote Sensing Letters, IEEE 12.5*: 1111-1115. doi: 10.1109/LGRS.2014.2385597

Conference publications

2. **Xie, Y.**, & Weng, Q. (Jul. 2016). Temporally extrapolating object-based threshold for updating urban extents from nighttime light data. In *Geoscience and Remote Sensing Symposium (IGARSS), 2016 IEEE International (pp. 1792-1795). IEEE.*

1. **Xie, Y.**, Weng, Q., & Weng, A. (Jun. 2014). A comparative study of NPP-VIIRS and DMSP-OLS nighttime light imagery for derivation of urban demographic metrics. In *Earth Observation and Remote Sensing Applications (EORSA), 2014 3rd International Workshop on (pp. 335-339). IEEE.*

Book Chapters

1. **Xie, Y.** and Weng, Q. "Use of nighttime imaging data to assess decadal trends in energy use in China", *Remote Sensing for Sustainability*, CRC Press, 2016.

PRESENTATIONS

Invited presentations
- 2022: "Remote sensing of irrigation for the US", USGS Powell Center Workshop on US Water Use, Apr. 24.
- 2021: "Remote sensing of irrigation distribution, frequency, and change for the US", Hydro Talk, Sept. 29.
- 2021: "Mapping irrigation distribution using remote sensing", Panel Discussion, Illinois State Water Survey, Feb. 17.
- 2018: "Preliminary results of mapping irrigated croplands across the United States", USGS, Sioux Falls, South Dakota, U.S. May 22, 2018.
- 2016: "Updating/Backdating Urban Extents from Enhanced Time-series Nighttime Lights by Using Object-based Thresholding Method", EORSA 2016, Guangzhou, China, July 4-6; IGARSS, Beijing, China, Jul. 10-15.

Other presentations
- 2022: "Mapping irrigation practices across the US using GEE and machine learning", Geo for Good Summit 2022, Mountain View, CA, U.S., Oct. 4-6 (Poster).
- 2022: "Abandoned croplands in the US: mapping accuracy, spatiotemporal patterns, and current land uses", Great Lakes Bioenergy Research Center Annual Science Meeting, Lake Geneva, WI, U.S., May 17-19 (Poster).
- 2022: "Identifying intermittently and formerly irrigated croplands suitable for bioenergy feedstocks production", Department of Energy Annual Review of Great Lakes Bioenergy Research Center, Feb. 20 (Poster & panel discussion).
- 2020: "Nationwide abandoned croplands available for bioenergy production in the United States", Great Lakes Bioenergy Research Center Sustainability Meeting, Oct. 5 (Oral).
- 2019: "Annual maps of irrigated agriculture at 30-m resolution across the United States, 1997-2017", AGU Fall Conference, San Francisco, CA, U.S., Dec. 11 (Poster).
- 2019: "Mapping abandoned croplands for bioenergy feedstock production across the United States from satellite imagery, 1986-2017", Great Lakes Bioenergy Research Center Annual Science Meeting, Lake Geneva, WI, U.S., May 21-23 (Poster).
- 2019: "Temporal variations of artificial nighttime lights and their implications for urbanization in the conterminous United States, 2013–2017", AAG Annual Conference, Washington D.C., U.S., Apr. 3-9 (Oral).

- 2018: "Mapping irrigated croplands across the United States with Landsat Imagery", AGU Fall Conference, Washington D.C., U.S., Dec. 9-14 (Oral).
- 2015: "Characterizing Spatial and Temporal Pattern of Energy Consumption by Using Time-series Nighttime Light Imageries", AAG Annual Conference, Chicago, Illinois, U.S., Apr. 21-25. (Oral).
- 2014: "A comparative study of NPP-VIIRS and DMSP-OLS nighttime light imagery for derivation of urban demographic metrics", The 3rd International Workshop on Earth Observation and Remote Sensing Applications (EORSA 2014), Changsha, China, Jun. 11-14. (Oral).
- 2014: "Capacity of Nighttime Light Imagery for Depicting Urban Area", ASPRS Annual Conference, Louisville, Kentucky, U.S., Mar. 23-28. (Oral).

PROFESSIONAL AFFILIATIONS AND SERVICES

Editorial board member
- ISPRS Journal of Photogrammetry and Remote Sensing (July 2019 – current)
- ISPRS Open Journal of Photogrammetry and Remote Sensing

Professional members
- American Geophysical Union (AGU)
- American Association of Geographers (AAG)
- IEEE Geoscience and Remote Sensing Society (GRSS)
- American Society for Photogrammetry & Remote Sensing (ASPRS)

Peer reviewer of journals
PNAS; Remote Sensing of Environment; ISPRS; International Journal of Applied Earth Observation and Geoinformation; Journal of Environmental Management; Science of Total Environment; IJRS; JSTARS; GIScience & Remote Sensing; IEEE Geoscience and Remote Sensing Letters; Remote Sensing; Sustainability; Sensors; Earth System Science Data; Water Resources Research; International Journal of Digital Earth; Global Change Biology

Other Services
- Primary convener for the session – Agricultural land use change and secondary succession: patterns, drivers, and environment (virtual), AGU Fall Conference, Dec. 2020.
- Primary convener and chair for the session – Urbanization and its environmental impacts under climate change (virtual), AGU Fall Conference, Dec. 2020.
- Judge for student presentation competition, AGU Fall Conference, Dec. 2020. (Virtual).
- Judge for student presentation competition, AGU Fall Conference, San Francisco, CA, U.S.,

Dec. 9-13, 2019.

- Convener and chair for the session - Urbanization, Climate Change, and the Environment, AGU Fall Conference, San Francisco, CA, U.S., Dec. 9-13, 2019.
- Chair for the Session - Urbanization, Coastal Vulnerability, and Sustainability (I): EO-based Essential Urban Variables, AAG Annual Meeting, Washington D.C., Apr. 3-9, 2019.
- Chair for the Session - Urban Remote Sensing from Local to Global Scale (III): Essential Urban Variables and Indicators, AAG Annual Meeting, Boston, Massachusetts, U.S., Apr. 5-9, 2017.
- Chair for the Session - Urban Night Light and Gas Flare Mapping, ASPRS Annual Conference, Louisville, Kentucky, U.S., Mar. 23-28, 2014.