Ruohan Li

website: Ruohan-Li.github.io *E-mail*: r526li@umd.edu

ACADEMIC APPOINTMENTS

- **Postdoctoral Research Associate**, Department of Geographical Sciences, University of Maryland, College Park, Aug. 2024 – Present. Advisors: Dr. Yiqun Xie and Dr. Tatiana Loboda

EDUCATION

- Ph.D., Geographical Sciences, University of Maryland, College Park, Sept. 2019 - May. 2024
- B.S., Honours Geomatics with Math Minor, University of Waterloo, Canada, Sept. 2017 - Jun. 2019
- B.E., Remote Sensing Science and Technology, Wuhan University, China, Sept. 2015 – Jun. 2019

RESEARCH INTERESTS

- Deep learning in physical-informed machine learning and spatiotemporal forecasting.
- Quantitative remote sensing based on the radiative transfer models.
- Atmosphere-surface interactions within the context of climate change.

PUBLICATIONS

- **Li, R.**, Wang, D., Devadiga, S., Sarkar, S., Román, M. (2024). MCD18C62: A new version of MODIS Downward Shortwave Radiation and Photosynthetically Active Radiation products. *Accepted by IEEE Geoscience and Remote Sensing Letters*. https://doi.org/10.1109/LGRS.2024.3507822
- **Li, R.**, Xie, Y., Jia, X., Wang, D., Li, Y., Zhang, Y., Wang, Z., Li, Z. (2024). SolarCube: An Integrative Benchmark Dataset Harnessing Satellite and In-situ Observations for Large-scale Solar Energy Forecasting. *The Thirty-eight Conference on Neural Information Processing Systems Datasets and Benchmarks Track*
- **Li, R.**, Wang, D., Wang, Z., Liang, S., Xie, Y., & He, J. (2024). Transformer approach to nowcasting solar energy using geostationary satellite data. *Applied Energy*, 377, 124387. https://doi.org/10.1016/j.apenergy.2024.124387
- Cheng, F., Li, Zhan., Yang, Z., **Li, R.**, Wang, D. Jia, A., Li, K., Zhao, B., Wang, S., Yin, D., Li, S., Xue, W., Cribb, M., Wei J. (2024). First retrieval of 24-hourly 1-km-resolution gapless surface ozone (O3) from space in China using artificial intelligence: diurnal variations and implications for air quality and phytotoxicity. *Remote Sensing of Environment*, 316, 114482. https://doi.org/10.1016/j.rse.2024.114482
- Xu, S., Wang, D., Liang, S., Jia, A., **Li, R.**, Wang, Z., Liu, Y. (2024). A novel approach to estimate land surface temperature from landsat top-of atmosphere reflective and emissive data using transfer-learning neural network. *Science of The Total Environment*, 955, 176783. https://doi.org/10.1016/j.scitotenv.2024.176783.
- Xie, Y., Wang, Z., Chen, W., Li, Z., Jia, X., Li, Y., Wang, R., Chai, K., **Li, R.** & Skakun, S. (2024). When are Foundation Models Effective? Understanding the Suitability for Pixel-Level Classification Using Multispectral Imagery. *arXiv preprint arXiv:2404.11797*.

- **Li, R.**, Wang, D., & Liang, S. (2023). Comparison between deep learning architectures for the 1 km, 10/15-min estimation of downward shortwave radiation from AHI and ABI. *Remote Sensing of Environment*, 295, 113697. https://doi.org/10.1016/j .rse.2023.113697
- **Li, R.**, Wang, D., Wang, W., and Nemani, R. (2023). A GeoNEX-based high-spatiotemporal-resolution product of land surface downward shortwave radiation and photosynthetically active radiation, *Earth Syst. Sci. Data*, 15, 1419–1436, https://doi.org/10.5194/essd-15-1419-2023
- **Li, R.**, Wang, D., Liang, S., Jia, A., & Wang, Z. (2022). Estimating global downward shortwave radiation from VIIRS data using a transfer-learning neural network. *Remote Sensing of Environment*, 274, 112999.
- **Li, R.**, Wang, D., & Liang, S. (2021). Comprehensive assessment of five global daily downward shortwave radiation satellite products. *Science of Remote Sensing*, 4, 100028. https://doi.org/10.1016/j .srs.2021.100028
- Wang, D., Liang, S., **Li, R.**, & Jia, A. (2021). A synergic study on estimating surface downward shortwave radiation from satellite data. *Remote Sensing of Environment*, 264, 112639. https://doi.org/10.1016/j .rse.2021.112639
- Farrell, S. L., Duncan, K., Buckley, E. M., Richter-Menge, J., & **Li, R.** (2020). Mapping sea ice surface topography in high fidelity with ICESat-2. *Geophysical Research Letters*, 47(21), e2020GL090708.

DATA PRODUCT CONTRIBUTIONS

- MODIS/Terra+Aqua Surface Radiation Daily/3-Hour (MCD18)
  https://lpdaac.usgs.gov/products/mcd18c2v061/
- AHI/ABI Surface Radiation Hourly (GeoNEX DSR/PAR)
  https://data.nas.nasa.gov/geonex/geonexdata/GOES16/GEONEX-L2/DSR-PAR/
  https://data.nas.nasa.gov/geonex/geonexdata/HIMAWARI8/GEONEX-L2/DSR-PAR/
- Suomi-NPP VIIRS Surface Radiation Daily/3-Hour (VNP18A1)
  In process
- SolarCube
  https://doi.org/10.5281/zenodo.11498739

RESEARCH ASSISTANT EXPERIENCE

- Graduate Research Assistant, with Dr. Yiqun Xie, UMD, Jan 2024 – present
  - In collaboration with Imazon, leading a project focused on detecting road expansion in the Amazon forest and its deforestation impacts based on Planet data using Google Earth Engine.
  - Evaluated foundation models for generalist geospatial artificial intelligence on crop types, burn scars, and flood detection classification tasks from satellite imageries.
- Graduate Research Assistant, with Dr. Dongdong Wang, UMD, Sep 2020 – May 2024
  - Conducted research in collaboration with NASA on generating and maintaining several global downward shortwave radiation and photosynthetically active radiation products.
  - Collected and cleaned in-situ data for product assessment.
  - Analyzed spatial heterogeneity and diurnal variation of shortwave radiation at global scale.
  - Drafted user guides and addressed user questions to assist with product utilization.
- Graduate Research Assistant, with Dr. Sinead Louise Farrell, UMD, June 2020 – Sep 2020

  - Combined ICESat-2 transect with the Sentinel-2 images to indicate arctic floe size distribution and lead frequency.
  - Visualized sea ice surface topography with high fidelity to study changes in polar ice features.
- Research Assistant Internship, with Dr. Chunxiang Cao, Chinese Academy of Sciences, Aug - Oct 2018
  - Developed an innovative method to continuously detect dust extension and intensity with infrared bands using Himawari-8/AHI data during both day and night.
  - Discovered dust origin and path during the dust events in spring 2018 in China, enhancing understanding of regional atmospheric phenomena.

TEACHING EXPERIENCE

- Instructor
  - GEOG 276: "Principles of Python Programming and Geocomputing", UMD
    Winter 2024
- Teaching Assistant
  - GEOG 330: "As the World Turns: Society and Sustainability in a Time of Great Change", UMD
    Winter 2021, Winter 2020, Fall 2019
  - GEOG 301: "Advanced Geographical Environmental Systems", UMD
    Spring 2020
  - GEOG 472: "Remote Sensing: Digital Processing and Analysis", UMD
    Spring 2024, Guest lecture

CONFERENCES

- **Li, R.**, & Wang, D. Comparison between deep learning architectures for the 1 km, 10/15-min estimation of downward shortwave radiation from AHI and ABI. Poster presented at the MODIS Science Team Meeting, College Park, MD, May 2023
- **Li, R.**, Wang, D., & Liang, S. Comprehensive assessment of five global daily downward shortwave radiation satellite products. Poster presented at American Geophysical Union Fall Meeting, New Orleans, LA, December 2021

SKILLS

- Programming languages: Linux, Python, C/C++, MATLAB, R, JavaScript, Fortran
- Data analysis and model constructions: Cloud computing, Tensorflow, PyTorch, SQL
- Spatial analysis: Google Earth Engine, ArcGIS, QGIS, ENVI

HONORS AND AWARDS

- Ann G. Wylie Dissertation Fellowships for AY 2023-24, UMD, 2023
- Graduate School's Outstanding Graduate Assistant (OGA) Awards, UMD, 2023
- Excellence in Graduate Research Award, Department of Geographical Sciences, UMD, 2022 & 2023
- Jacob K. Goldhaber Travel Grant, UMD, 2021

- Distinguished Academic Achievement Award, University of Waterloo, 2019
- The Department of Geography and Environmental Management Scholarship, University of Waterloo, 2018
- National Scholarship (top %2), China, 2017