Xiaojie Gao (高孝杰)

Postdoctoral Researcher
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Personal Website; GitHub; Google Scholar

A remote sensing scientist and terrestrial ecosystem ecologist who:

- is broadly interested in advanced **remote sensing** and **computational technology** to understand **global vegetation dynamics** and its interactions with **biogeochemical cycles**.
- improves **natural-based solutions** to mitigate future **climate change**.
- strongly advocates for **open science**.

Professional Appointments

2023-present **Harvard University, USA**
Harvard Forest
Postdoctoral Researcher
Advisor: Jonathan R. Thompson

2019-2023 **North Carolina State University, USA**
Center for Geospatial Analytics
Graduate Research Assistant
Advisor: Josh M. Gray

2016-2019 **National Administration of Surveying, Mapping, and Geoinformation, China**
Geospatial Engineer

2014-2016 **Chinese Academy of Sciences**
Institute of Remote Sensing and Digital Earth
Graduate Research Assistant

Education

2019-2023 **North Carolina State University**
Ph.D. in Geospatial Analytics
NASA Future Investigator in Earth and Space Science and Technology (FINESST)
Advisor: Josh M. Gray
Dissertation: Does chilling explain the divergent response of spring phenology to urban heat islands?

2014-2016 **Chinese Academy of Sciences**
Institute of Remote Sensing and Digital Earth
Joint Graduate Student in Hyperspectral Remote Sensing
Advisor: Lifu Zhang, Yi Cen

2013-2016 **Chengdu University of Technology**
M.E. in Remote Sensing for Natural Resources and Environment
Advisor: Ji Jian

2009-2013 **Chengdu University of Technology**
B.S., Geography Information System

Publications

- **Gao, X.**, Stonebrook, S. Green, T., Moon, M. Friedl, M. A. Cross-Scalar Analysis of Multisensor Land Surface Phenology. *Remote Sensing of Environment*. (In revision)
- **Gao, X.**, Zhou, Z., Ollinger, S. V., Jaclyn Hatala Matthes, J. H., Jiao, W., Thompson, J. R. pnetr: An R package for the PnET family of forest ecosystem models. *Methods in Ecology and Evolution*. (Under Review)
- Zhu, C., She, X., **Gao, X.**, Huang, Y., Zeng, Y., Ding, C., Fu, D., Shao, J., Li, Y. Spatiotemporal variation of spring phenology and the corresponding scale effects and uncertainties: A case study in southwestern China. *International Journal of Applied Earth Observation and Geoinformation*. (Under Review)
- Green, T. W., Moon, M., Gray J., **Gao, X.**, & Friedl, M. A. Spatial and Temporal Covariance in Land Surface Phenology, Local Meteorology, and Annual Gross Primary Productivity. *Agricultural and Forest Meteorology*. (In Revision)
- Tang, Q., Duncan, J. M., Kemanian, A. R., **Gao, X.**, Forsythe, B., Harper, J., Eissenstat, D. M. Chestnut oak is more responsive to vapor pressure deficit on shale- than sandstone-derived soils. (Under Review)

- **Gao, X.**, Richardson, A.D., Friedl, M. A., Moon, M, & Gray, J.M. (2024). Thermal Forcing Versus Chilling? Misspecification of Temperature Controls in Spring Phenology Models. *Global Ecology and Biogeography*. (Accepted)
- **Gao, X.**, McGregor, I.R., Gray, J.M., Friedl, M.A., & Moon, M. (2023). Observations of satellite land surface phenology indicate that maximum leaf greenness is more associated with global vegetation productivity than growing season length. *Global Biogeochemical Cycles*, e2022GB007462.
- Liu, K., Li, X., Wang, S., **Gao, X.** (2022). Assessing the effects of urban green landscape on urban thermal environment dynamic in a semiarid city by integrated use of airborne data, satellite imagery and land surface model. *International Journal of Applied Earth Observation and Geoinformation*, 107, 102674.
- Bo, Y., Li, X., Liu, K., Wang, S., Zhang, H., **Gao, X.**, Zhang, X. (2022). Three Decades of Gross Primary Production (GPP) in China: Variations, Trends, Attributions, and Prediction Inferred from Multiple Datasets and Time Series Modeling. *Remote Sensing*, 14(11).
- Yang, Z., Dai, X., Wang, Z., **Gao, X.**, Qu, G., Li, W., Li, J., Lu, H. and Wang, Y. (2022). The dynamics of Paiku Co lake area in response to climate change. *Journal of Water and Climate Change*, 13(7), 2725-2746.
- Zhang, S., Dai, X., Li, J., **Gao, X.**, Zhang, F., Gong, F., Lu, H., Wang, M., Ji, F., Wang, Z. and Peng, P., (2022). Crop classification for UAV visible imagery using deep semantic segmentation methods. *Geocarto International*, 1-25.
- **Gao, X.**, Gray, J.M., & Reich, B.J. (2021). Long-term, medium spatial resolution annual land surface phenology with a Bayesian hierarchical model. *Remote Sensing of Environment*, 261, 112484.
- **Gao, X.**, Gray, J., Cohrs, C.W., Cook, R., Albaugh, T.J. (2021). Longer greenup periods associated with greater wood volume growth in managed pine stands. *Agricultural and Forest Meteorology*, 297, 108237.

Presentations

- **Gao, X.** (2024). Facilitate Nature-based Solutions by Improving Landscape Simulation and Remote Sensing. Geo For Good 2024 Dublin Mini Summit, Google LLC. **Invited Panel Speaker**.
- **Gao, X.** (2024). Observing and Understanding Plant Phenology and Climate Change through Satellite

Remote Sensing. Cary Institute of Ecosystem Studies. **Invited talk**.

- **Gao, X.** (2024). Seeing Forest Seasonality from Space. Harvard Forest Seminar, Harvard University. **Invited talk**.
- **Gao, X.,** Pasquarella, V., Brown, C., Thompson, J. R. (2023). G4E Science & Impact Talk. Google LLC. **Invited talk**.
- **Gao, X.**, McGregor, I.R., Gray, J.M., Friedl, M.A., & Moon, M. (2023). Maximum leaf greenness is more associated with global vegetation productivity than growing season length. Global Congress on Advanced Satellite Communications. **Invited talk.**
- **Gao, X.**, Gray, J. (2022). Problems in the mechanistic spring phenology models. American Geophysical Union conference. **Poster presentation.**
- **Gao, X.**, Gray, J. (2022). Does chilling explain the divergent response of spring phenology to urban heat islands? North Carolina State University Graduate Research Symposium. **Poster presentation.**
- **Gao, X.** (2022). Observing Long-term annual land surface phenology at medium spatial resolution. Indigo Ag, Inc. remote sensing group. **Invited talk**
- **Gao, X.**, McGregor, I., Gray, J. (2021). Satellite observations underestimate the effect of growing season length on global vegetation productivity. American Geophysical Union conference. **Oral presentation.**
- **Gao, X.**, Gray, J., Reich, B. (2020). Quantifying Long-term Land Surface Phenology with Uncertainty by 30 m Landsat Observations Using a Bayesian Hierarchical Model. American Geophysical Union conference. **Poster presentation.**
- **Gao, X.**, Gray, J., Cohrs, C., Cook, R. (2020). How does phenology control managed forest productivity? CNR Graduate Research Symposium, North Carolina State University. **Poster presentation.**

Media Exposures

- Graduating Student Spotlight: Xiaojie Gao. (2023). *Student Success*, *North Carolina State University*.
- Scientists Use Satellites to Track Earth 'Greening' Amid Climate Change. (2023). *News, North Carolina State University*.
- Observing Long-Term Annual Land Surface Phenology at Medium Spatial Resolution. (2021). *Center for Geospatial Analytics News, North Carolina State University*.

Honors and Awards

2024	● Open Science Grid (OSG) School 2024 Research Computing Travel Award. The OSG Consortium, University of Wisconsin-Madison.
2023	● Honorable Mention, 2023 Envisioning Research Contest (student/postdoc category). North Carolina State University.
2021	● Future Investigators in NASA Earth and Space Science Technology (FINESST) award, NASA
2017	● Surveying and Mapping Technology Improvement Award of Sichuan, China - Grade 1 ● Satellite Navigation and Position Technology and Science Award, China - Grade 1
2016	● Outstanding Graduate Award ● Excellent Graduation Thesis Award
2015	● First Prize for Comprehensive Performance of Hyperspectral Application Lab, Chinese

Academy of Sciences
- Graduate Scholarship - Grade 2
- Excellent Presentation of the 7th Master and Doctoral Forum of Sichuan, China

2014
- Special Contribution Award of Hyperspectral Application Lab, Chinese Academy of Sciences
- National Scholarship for Graduate Students

2013
- Excellent Article Award of the 3rd Graduate Forum of National Remote Sensing and Geo-Information Science - Grade 2

Research Projects

2023-present **Co-produced modeling of socio-environmental dynamics of financialized forestlands and alternative future scenarios** (NSF-DISES, 22-05705)
Postdoctoral Researcher: landscape simulation, nature-based climate solution.

2021-2023 **Does chilling explain the divergent response of spring phenology to urban heat islands? (**NASA FINESST awarded project, $135,000)
Future Investigator: Ph.D. dissertation research

2019-2021 **An operational multisource land surface phenology product from Landsat and Sentinel 2** (NASA, NNH17ZDA001N-LCLUC)
Research Assistant: land surface phenology product quality assessment and validation

2014-2016 **Research on hyperspectral remote sensing intelligent observation mode for typical surface scene** (National Natural Science Foundation of China, No. 41371359)
Research Assistant: hyperspectral target detection algorithm design and implementation

Seminars & Workshops

- R programming in ecology studies. Workshop. *Research Experience for Undergraduate (REU) program. Harvard Forest, Harvard University*. **Lecturer**.
- GitHub and open science practice. Workshop. *Research Experience for Undergraduate (REU) program. Harvard Forest, Harvard University*. **Lecturer**.
- Show me the money: Be your own boss with grants and fellowships. (2022). Seminar. *Center for Geospatial Analytics, North Carolina State University*. **Invited guest speaker**.
- Open science best practices. (2022). Seminar. *Center for Geospatial Analytics, North Carolina State University*. **Lecturer**.
- High-performance computing in geospatial analytics. (2021). *Geospatial Data Mining class, North Carolina State University*. **Co-guest Lecturer**.
- Why do I program R in Visual Studio Code instead of RStudio? (2020). Workshop. *Center for Geospatial Analytics, North Carolina State University*. **Lecturer**.

Student Mentorships

- Casey Helton. University of North Georgia.
  05/2024-08/2024, Research Experience for Undergraduates (REU) program at Harvard Forest.
  Topic: Long-term phenological changes and carbon sequestration.

- Lu Hou. Master student. Guangzhou University, China.
  03/2023-present. Co-advisor with Dr. Jinnian Wang (Guangzhou University) and Dr. Yi Cen (Chinese Academy of Sciences).
  Topic: Estimating long-term gross primary productivity estimation using Landsat observations.

- Chongjing Zhu. Master student. Southwest University, China.
  09/2023-present. Co-advisor with Dr. Yao Li.
  Publication: Spatiotemporal variation of spring phenology and the corresponding scale effects and uncertainties: A case study in southwestern China. *(Under review)*

Journal Reviews

- Nature Climate Change
- Nature Communications
- Remote Sensing of Environment
- New Phytologist
- Agricultural and Forest Meteorology
- Science of the Total Environment
- Ecological Indicators
- Journal of Geophysical Research: Biogeosciences
- International Journal of Applied Earth Observation and Geoinformation
- International Journal of Emerging Investigators (a non-profit journal to prepare high-school students to be researchers)

Others

- "blsp" R package: A Bayesian hierarchical model that quantifies long-term annual land surface phenology from sparse time series of vegetation indices.
- "pnetr" R package: A family of photosynthesis and evapotranspiration ecosystem models.