Zijun Yang
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EDUCATION

University of Illinois Urbana-Champaign School of Earth, Society, and Environment (Urbana, IL)
- **Ph.D.**, Geography, May 2024
- Dissertation: *A Phenology-guided Deep Learning Framework for Near Real-time Crop Monitoring*
- Committee: Chunyuan Diao (Chair), Shaowen Wang, Mark J Lara, Murugesu Sivapalan

University of Michigan School for Environment and Sustainability (Ann Arbor, MI)
- **Master of Science**, Natural Resources and Environment (Environmental Informatics), Aug. 2018
- Thesis: *Using Spatial Entropy of Urban Vegetation to Measure Neighborhood Stability in Shrinking Cities*
- Committee: Dan Brown (Chair), Meha Jain

Sun Yat-Sen University School of Geography and Planning (Guangzhou, China)
- **Bachelor of Science**, Geographic Information System, June 2016
- Advisor: Li Zhuo

ACADEMIC APPOINTMENTS

- 2024-present **Assistant Professor**
  Department of Earth and Ocean Sciences
  University of North Carolina Wilmington
- 2019-2023 **Graduate Research Assistant**
  Department of Geography and Geographic Information Science
  University of Illinois Urbana-Champaign
- 2018-2019 **Graduate Teaching Assistant**
  Department of Geography and Geographic Information Science
  University of Illinois Urbana-Champaign
- 2018 **Graduate Student Instructor**
  School for Environment and Sustainability
  University of Michigan, Ann Arbor

REARCH INTERESTS

- Time Series Remote Sensing
- Agriculture and Food Security
- Geospatial Artificial Intelligence
- Geospatial Data Science
- Environmental Sustainability

HONORS AND AWARDS

- **Block Grant Fellowship ($20,000)**, University of Illinois Urbana-Champaign, 2023
- **Foster Graduate Fellowship ($2,200)**, University of Illinois Urbana-Champaign, 2023
- **Planet Fellowship ($10,000)**, Taylor Geospatial Institute, 2023
- **Schlesinger Travel Grant ($750)**, School of Earth, Society, and Environment, University of Illinois Urbana-Champaign, 2022

- **Best Geography and GIS Poster**, 2021 SESE Research Review, University of Illinois Urbana-Champaign, 2021
- **Supplementary Summer Block Grant ($1000)**, Graduate College, University of Illinois Urbana-Champaign, 2020
- **Student Honors Paper Competition Award – First Place ($500)**, Remote Sensing Specialty Group, American Association of Geographers (AAG), 2020
- **Teacher Ranked as Excellent**, Center for Teaching Excellence, University of Illinois Urbana-Champaign, 2019
- **SYSU Scholarship for Outstanding Students**, Sun Yat-Sen University, 2014-2016
- **SYSU Outstanding Student League Member**, Sun Yat-Sen University, 2014

WORKING PAPERS (* denotes equal contribution)

- Lyu, F.*, **Yang, Z.***, Diao, C. & Wang, S. (In Review). Multi-stream STGAN: A Spatiotemporal Image Fusion Model with Improved Temporal Transferability.
- **Yang, Z.**, & Diao, C. (In Preparation). A novel deep learning framework for within-season field-level crop phenology characterization.
- **Yang, Z.***, Liu, Y.*, & Diao, C., (In Preparation). Towards large-scale remote sensing of crop phenology: a comprehensive evaluation of methods, features, and uncertainty.
- Chen, J., Liu, Y., Diao, C., **Yang, Z.**, Zhou, Z. (In Preparation). CropSync: towards a large-scale operational framework for within-season crop type mapping using Google Street View and Harmonized Landsat and Sentinel-2 imagery.

PUBLICATIONS

- **Yang, Z.**, Diao, C., Gao, F., & Li, B. (2024). EMET: An emergence-based thermal phenological framework for near real-time crop type mapping. ISPRS Journal of Photogrammetry and Remote Sensing, 215, 271-291.
- Zhao, Y., Diao, C., Augspurger, C. K., & **Yang, Z.** (2023). Monitoring spring leaf phenology of individual trees in a temperate forest fragment with multi-scale satellite time series. *Remote Sensing of Environment*, 297, 113790.
- Liu, Y., Diao, C., & **Yang, Z.** (2023). CropSow: An integrative remotely sensed crop modeling framework for field-level crop planting date estimation. *ISPRS Journal of Photogrammetry and Remote Sensing*, 202, 334-355.
- **Yang, Z.**, Diao, C., & Gao, F. (2023). Towards Scalable Within-Season Crop Mapping with Phenology Normalization and Deep Learning. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 16, 1390-1402.
- **Yang, Z.**, Diao, C., & Li, B. (2021). A Robust Hybrid Deep Learning Model for Spatiotemporal Image Fusion. *Remote Sensing*, 13(24), 5005.
- Diao, C., **Yang, Z.**, Gao, F., Zhang, X., & Yang, Z. (2021). Hybrid phenology matching model for robust crop phenological retrieval. *ISPRS Journal of Photogrammetry and Remote Sensing*, 181, 308-326.

CONFERENCE PUBLICATIONS

- Lyu, F., **Yang, Z.**, Xiao, Z., Diao, C., Park, J., & Wang, S. (2022). CyberGIS for Scalable Remote Sensing Data Fusion. *In Practice and Experience in Advanced Research Computing* (pp. 1-4).

PRESENTATIONS

Oral Presentations

- **Yang, Z.,** & Diao. C. A novel deep learning framework for near real-time field-level crop phenology characterization. *Annual Meeting of the American Association of Geographers (AAG)*, Honolulu, HI, Apr. 16-20, 2024
- **Yang, Z.,** Diao. C. & Gao, F. EMET: An emergence-based thermal phenological framework for near real-time crop type mapping. *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA. Dec. 11-15, 2023
- **Yang, Z.,** Diao. C. & Gao, F. Within-season crop mapping at the field level using a phenology-guided deep learning model. *Annual Meeting of the American Association of Geographers (AAG)*, Denver, CO. Mar. 22-Mar. 27, 2023
- **Yang, Z.,** Diao. C. & Gao, F. A Novel Phenology Guided Deep Learning Model for Within-Season Field-Level Crop Mapping. *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL. Dec. 12-16, 2022
- **Yang, Z.,** & Diao. C. A phenolgy-guided deep learning model for in-season crop mapping at the field level. *Annual Meeting of the American Association of Geographers (AAG)*, Virtual Meeting, Feb. 25-Mar. 1, 2022
- **Yang, Z.,** & Diao. C. A deep learning-based phenology matching model for characterizing crop phenological stages with fused high spatio-temporal resolution imagery. *Annual Meeting of the American Association of Geographers (AAG)*, Virtual Meeting, Apr. 7-11, 2021
- Diao, C., & **Yang. Z.** Retrieval of crop growing progress with remote sensing and phenology-matching models. *Annual Meeting of the American Association of Geographers (AAG)*, Virtual Meeting, Apr. 7-11, 2021
- Diao, C., & **Yang. Z.** An innovative phenology-matching model to estimate crop growing stages. *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA. Dec. 7-11, 2020
- **Yang, Z.,** & Diao. C. A robust hybrid deep learning modeling framework for spatiotemporal image fusion. *Annual Meeting of the American Association of Geographers (AAG)*, Denver, CO. Apr. 6-10, 2020
- **Yang, Z.** Using Spatial Entropy of Urban Vegetation to Measure Neighborhood Stability in Shrinking Cities. *2018 School for Environment and Sustainability (SEAS) Capstone Conference*, Ann Arbor, MI. Apr. 12-13, 2018

Poster Presentations

- **Yang, Z.,** & Diao. C. A weakly supervised deep learning framework for near real-time field-level crop phenology characterization. *Taylor Geospatial Institute (TGI) Town Hall Event*, St. Louis, MO, May 22, 2024
- **Yang, Z.,** & Diao. C. A novel deep learning framework for near real-time field-level crop phenology characterization. *2024 School of Earth, Society, and Environment (SESE) Research Review*, Urbana, IL, Feb. 9, 2024
- **Yang, Z.,** & Diao. C. A novel deep learning framework for within-season field-level crop phenology characterization. *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA. Dec. 11-15, 2023
- **Yang, Z.,** Diao. C. & Gao, F. An emergence-based thermal phenological framework for within-season crop type mapping. *NASA Carbon Cycle & Ecosystems Joint Science Workshop*, College Park, MD. May 8-12, 2023
- **Yang, Z.,** Diao. C. & Gao, F. A Novel Phenology Guided Deep Learning Model for Within-Season Field-Level Crop Mapping. *2023 School of Earth, Society, and Environment (SESE) Research Review*, Urbana, IL, Feb. 24, 2023
- **Yang, Z.,** & Diao, C. A deep learning-based model for characterizing crop phenological stages with fused imagery. *2021 SESE Research Review*, Urbana, IL, Apr. 23, 2021

- **Yang, Z.,** & Diao, C. Satellite Data Deluge: An Innovative Deep Learning Model for Fusing Multi-Scale Spatio-Temporal Satellite Imagery. *2019 School of Earth, Society, and Environment (SESE) Research Review,* Urbana, IL. Feb. 15, 2019

TEACHING EXPERIENCE

University of North Carolina Wilmington
GGY 429/529 – Aerial Drone Applications in Geosciences, Instructor, Fall 2024
- Developed week lectures and labs on drone applications
- Designed fieldwork for students to conduct drone data collection

University of Illinois Urbana-Champaign
GEOG 477 – Introduction to Remote Sensing, Guest Lecturer, Fall 2019 and Spring 2021
- Designed a guest lecture on introduction to Google Earth Engine and basic programming
- Instructed students to access large geospatial datasets and conduct fundamental spatial analysis

GEOG 379 – Intro to GIS Systems, Graduate Teaching Assistant, Spring 2019
- Led weekly lab sessions on geospatial analysis using ArcMap and ArcGIS Online
- Updated course materials and prepared new slides according to the software updates
- Designed grading rubrics for lab assignments, graded weekly lab assignments and exams

GEOG 105 – Digital Earth, Graduate Teaching Assistant, Fall 2018
- Led weekly lab and/or discussion sessions on geospatial technologies and their impacts on human societies
- Updated slides and materials for the lab and discussion activities

University of Michigan, Ann Arbor
EAS 541 – Remote Sensing of Environment, Graduate Student Instructor, Spring 2018
- Instructed weekly lab sessions on remote sensing image processing with ERDAS
- Held office hours and study sessions to help students prepare for exams
- Revised grading rubrics for lab assignments and graded weekly lab assignments

RESEARCH EXPERIENCE

University of Illinois Urbana-Champaign, Graduate Research Assistant, Aug. 2019-May. 2023, and Graduate Research Fellow, May. 2023-present
Phenology Characterization
- Devised a near real-time framework for corn phenology characterization using weak-supervised deep learning and multi-source remote sensing
- Estimated crop phenological transition dates using phenophase extraction and phenology matching algorithms implemented in R
- Designed and conducted weekly flight missions of unmanned aerial vehicle in Trelease Woods (Urbana, IL) for data collection of tree-crown phenology

Crop Type Mapping
- Developed a phenology-guided deep learning model for fine-scale near real-time crop mapping
- Achieved accurate early crop type mapping by integrating time-series remote sensing, crop emergence estimation, and heat accumulation into crop type characterization

Spatiotemporal Image Fusion
- Developed hybrid CNN-LSTM deep learning satellite image fusion model to blend MODIS and Landsat imagery
- Generated temporally dense time series of satellite observations for crop type mapping and phenology characterization

University of Michigan, Ann Arbor, Master's Thesis Research, May 2017-June 2018
Satellite-based Modeling of Neighborhood Stability in Shrinking Cities
- Measured urban landscape change patterns with spatial metrics derived from Landsat images using ArcGIS and MATLAB
- Investigated and modeled the relation between urban shrinkage and various landscape and socio-economic variables using spatial econometric model in R

Sun Yat-Sen University, Undergraduate Research Assistant, Sept. 2015-June 2016
Satellite Imagery Spectral Unmixing
- Co-led a national undergraduate innovation project on investigating urban heat island in Guangzhou City using Landsat images
- Implemented and improved an algorithm on spectral unmixing of multispectral images using ArcGIS, MATLAB and IDL

PROFESSIONAL ACTIVITIES AND SERVICE

Journal Reviewer, 2022-present
- IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing
- IEEE Geoscience and Remote Sensing Letters
- International Journal of Applied Earth Observation and Geoinformation
- Cogent Food & Agriculture
- Plant Methods
- Scientific Reports

Conference Sessions
- **Session Organizer and Chair,** AAG 2024 Symposium on Geospatial Data Science for Sustainability: Advances in multitemporal remote sensing for terrestrial ecosystems (with Yilun Zhao, Zhijie Zhou, and Chunyuan Diao), *Annual Meeting of the American Association of Geographers (AAG)*, Honolulu, HI, Apr. 16-20, 2024
- **Session Organizer,** AAG Remote Sensing Specialty Group Student Honors Paper Competition (with Dameng Yin), *Annual Meeting of the American Association of Geographers (AAG)*, Honolulu, HI, Apr. 16-20, 2024
- **Session Organizer and Chair,** Advances in Agricultural Remote Sensing and Artificial Intelligence (with Chunyuan Diao), *Annual Meeting of the American Association of Geographers (AAG)*, Denver, CO. Mar. 22-27, 2023
- **Session Organizer and Chair,** Advances in Agricultural Remote Sensing and Artificial Intelligence (with Chunyuan Diao), *Annual Meeting of the American Association of Geographers (AAG)*, Virtual Meeting, Feb. 25-Mar. 1, 2022
- **Session Organizer and Chair,** Time Series Remote Sensing in Characterizing Land Surface Dynamics (with Chunyuan Diao), *Annual Meeting of the American Association of Geographers (AAG)*, Virtual Meeting, Apr. 7-11, 2021

Other Activities and Service
- **Exhibitor**, An Insight into Remote Sensing Research: PhD Students' Perspectives, *Engineering Open House 2024, University of Illinois Urbana-Champaign*, Urbana, IL. Apr. 5-6, 2024
- **Student Co-Director**, Remote Sensing Specialty Group, *American Association of Geographers (AAG)*, 2023-2025
- **Volunteer Reviewer**, Outstanding Student Presentation Awards, *American Geophysical Union (AGU) Fall Meeting*, Chicago, IL. Dec. 12-16, 2022
- **Track Leader**, Environmental Informatics Track, *School for Environment and Sustainability, University of Michigan*, Aug. 2017-Apr. 2018

PROFESSIONAL MEMBERSHIP

- American Association of Geographers (AAG), 2020-present
- American Geophysical Union (AGU), 2022-present

CERTIFICATES

- FAA Part 107 Remote Pilot Certificate

COMPUTER SKILLS

- **Software**: ArcGIS, ArcGIS Pro, QGIS, ENVI, Agisoft Metashape, Pix4Dcapture, Pix4Dmapper
- **Programming:** Python, R, MATLAB, SQL, CUDA, Spark, Hadoop, Tensorflow, Keras, PyTorch, Google Earth Engine