KEXIN SONG

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RESEARCH INTEREST

Satellite data fusion, time series analysis, forest disturbances, ecosystem resilience, and artificial intelligence.

EDUCATION

2020-present	Ph.D. in Natural Resources and the Environment, University of Connecticut
2020	M.S. in Meteorology and Physical Oceanography, University of Miami
2018	B.S. in Marine Technology, Ocean University of China

RESEARCH EXPERIENCE

University of Connecticut (UConn) **Storrs, CT**
Graduate Research Assistant, Advisor: Dr. Zhe Zhu Fall 2020 – present
Funded by Eversource Energy Center and NASA

- Monitored New England Forest disturbances from 2013-2024 using multi-sensor satellite time series, contributing to a more comprehensive understanding of insect infestations and forest health changes.
- Evaluated roadside tree failure risk in Connecticut due to declining forest health using machine learning models, providing actionable insights to reduce tree-related outages and enhance public safety.
- Conducted exploratory research on Amazon forest resilience utilizing Landsat time series, offering insights into the relationship between plant physiology and remotely sensed resilience.
- Developed a novel Time-series based Image Fusion algorithm for global-scale satellite image fusion, substantially enhancing Landsat/Sentinel-2 data fusion efficiency and accuracy.

Eversource Clean Energy & Sustainability Innovation Program (CESIP) **Storrs, CT**
Research Fellow, Mentor: Dr. Junbo Zhao (Department of Electrical Engineering) Summer 2023
Funded by Eversource Energy Center

- Initiated and led the "Solar Forecasting - Behind the Meter PV Generation Forecasting System" project and received a $ 2,500 fellowship from Eversource for innovative contributions.
- Implemented a U-net deep learning model on high-resolution aerial images to map rooftop solar PV installations in Connecticut, resulting in improved accuracy and efficiency in clean energy assessment.
- Developed regression models and leveraged geographic data to predict residential solar PV installations and electricity generation, providing strategic insights on clean energy growth to industry experts.

University of Miami (UM) **Miami, FL**
Advisor: Dr. Peter J. Minnett Fall 2018 – Summer 2020
Thesis: Accuracy Assessment of Summertime Reanalysis and Passive Microwave Sea-ice Concentration (SIC) Products in The Central Arctic.

PUBLICATIONS

- **Song K** and Zhu Z, "Can Empirical Indicators Reveal Forest Ecosystem Resilience to Drought?" (in preparation).
- **Song K**, Zhu Z, Qiu, Shi., Neigh, CRS., Ju, J., Zhou, Q., Olofsson, P., "TIF: A Time-series-based Image Fusion Algorithm." *Remote Sensing of Environment* (in preparation).
- **Song K** and Minnett PJ, 2024. Evaluation of Summertime Passive Microwave and Reanalysis Sea-Ice Concentration in the Central Arctic. *Earth and Space Science*, 11(1), 2023EA003214. https://doi.org/10.1029/2023EA003214

- Worthley T, Bunce A, Morzillo AT, Witharana C, Zhu Z, Cabral J, ... & Fahey RT (2024). Stormwise: Innovative Forest Management to Promote Storm Resistance in Roadside Forests. *Journal of Forestry*, fvae011. https://doi.org/10.1093/jofore/fvae011

CONFERENCE PRESENTATIONS

- "Can Autocorrelation Reveal Forest Ecosystem Resilience to Drought?", *AGU Fall Meeting*. Washington DC, December 2024
- "Unveiling Forest Resilience Changes in Response to Insect Disturbance: A Comprehensive Analysis Using PlanetScope Time Series", *AAG Annual Conference*, Honolulu, HI, April 2024
- "Improved Subtle Change Detection Using Landsat and Sentinel-2 Data Fusion: A Study of Spongy Moth Outbreaks in New England Forests", *AGU Fall Meeting*. Chicago, IL, December 2022
- "Forest Disturbance Monitoring at 10 m Spatial Resolution Using Sentinel-2 Time Series", *AGU Fall Meeting*. New Orleans, LA, December 2021

TEACHING EXPERIENCE

University of Connecticut (UConn) **Storrs, CT**

NRE 3535 Remote Sensing of Environment Fall 2023

- Led weekly lab sessions for undergraduates, fostering hands-on experiences in remote sensing techniques.
- Graded homework assignments and provided constructive feedback, enhancing students' understanding of the subject matter.
- Served as a guest instructor for the *Multispectral Remote Sensing* module, delivering engaging lectures.

SERVICE

- Reviewed manuscripts for *Remote Sensing of Environment* (4x) and *Science of Remote Sensing* (2x).
- Served as graduate student representative (2018) at the Rosenstiel School of Marine, Atmospheric, and Earth Science, University of Miami.

PROFESSIONAL DEVELOPMENT

- NASA JPL Summer School on Satellite Observations and Climate Models, Caltech, Pasadena, CA.
- Travel grant awarded for the OceanHackWeek: 5-day Collaborative Hackathon of Ocean and Data Science, University of Washington, Seattle, WA

SELECTED GRADUATE COURSES

Statistical Analysis of Geophysical Data	Quantitative Remote Sensing
Landscape Ecology	Remote Sensing Image Processing
Python Scripting of Geospatial Analysis	Small Watershed Modeling
Population and Community Ecology	Ecosystem Modeling

MEDIA COVERAGE

- Six UConn Teams Innovating Decarbonization this Summer through Unique Eversource Partnership Program, *UConn Today*
- Clean Energy & Sustainability Innovation Program Submission Finalists, *UConn Today*
- Diagnosis from the Sky: Catching Insect Infestations within Forests Before It's Too Late, *UConn Today*

TECHNICAL SKILLS

Python/Matlab/R: Proficient in statistical analyses, geospatial analysis, machine learning and deep learning, and data visualization. **HPC/Linux**: 6+ years of experience in parallel computing using UConn's HPC clusters. Strong knowledge of Linux system commands, scripting, and automation tasks, including satellite data acquisition and big data processing through bash scripting. **Software and Tools**: Experienced in SQL for database management, GIS tools (ArcGIS, ENVI), version control (Git), code development with VScode, and geospatial data analysis through Google Earth Engine.