Lei Song
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EDUCATION

Ph.D. & M.A. Geography 2023
Clark University, Worcester, MA, USA
Advisor: Lyndon Estes, Dissertation: *Combining Spatially-explicit Simulation of Animal Movement and Earth Observation to Reconcile Agriculture and Wildlife Conservation*

M.S. Applied Meteorology 2015
Nanjing University of Information Science & Technology, Nanjing, China

B.S. Geographic Information Science 2012
Nanjing University of Information Science & Technology, Nanjing, China

GRANTS AND FELLOWSHIP

2020 - 2023 **NASA FINESST Fellow** - Combining Spatially-explicit Simulation of Animal Movement and Earth Observation to Reconcile Agriculture and Wildlife Conservation (Grant # 80NSSC20K1640). Total award amount: $135,000. (Role: FI)

HONORS AND AWARDS

2018	The Pruser Dissertation Enhancement Awards, Graduate School of Geography, Clark University
2018	Harvard Design and Map Company Enhancement Award, Clark University
2012	Outstanding Graduates, Nanjing University of Information Science & Technology
2011	The Third Prize Scholarship, Nanjing University of Information Science & Technology
2009, 2015	The First Prize Scholarship, Nanjing University of Information Science & Technology

PEER-REVIEWED ARTICLES

Song, L., Estes, A. B., & Estes, L. D. (2023). A super-ensemble approach to map land cover types with high resolution over data-sparse African savanna landscapes. *International Journal of Applied Earth Observation and Geoinformation*, 116, 103152.

Song, L., & Estes, L. (2023). itsdm: Isolation forest-based presence-only species distribution modelling and explanation in r. *Methods in Ecology and Evolution*, 14(3), 831-840.

Estes, L., Ye, S., **Song, L.**, Luo, B., Eastman, J. R., Meng, Z., ... & Caylor, K. K (2021). High resolution, annual maps of field boundaries for smallholder-dominated croplands at national scales. *Frontiers in Artificial Intelligence*, 164.

Elmes, A., Estes, L., Avery, R., Caylor, K., ..., **Song, L.** ... & Lunga, D. (2019). Accounting for training data error in machine learning applied to Earth observations. *Remote sensing*, *12*(6), 1034.

Shi, Y., & **Song, L.** (2015). Spatial Downscaling of Monthly TRMM Precipitation Based on EVI and Other Geospatial Variables Over the Tibetan Plateau From 2001 to 2012. *Mountain Research and Development, 35(2)*, 180-194.

Shi, Y., **Song, L.**, Xia, Z., Lin, Y., Myneni, R. B., Choi, S., ... & Yang, F. (2015). Mapping Annual Precipitation across Mainland China in the Period 2001-2010 from TRMM3B43 Product Using Spatial Downscaling Approach. *Remote Sensing, 7(5)*, 5849-5878.

INVITED TALKS AND PRESENTATIONS

2022 **Song, L.**, A super-ensemble approach to map land cover types with high resolution over data-sparse African savanna landscapes. 8th NICFI Satellite Data Program Scientific Research Roundtable. Online. 01 June 2023.

CONFERENCE PRESENTATIONS & POSTERS

Song, L., Estes, L., Estes, A., Using a nested multi-Scale method to characterize landscape utilization and conservation status of African Savanna Elephant, in *NASA Biological Diversity and Ecological Forecasting Team Meeting (September 20-22, 2022)*

Song, L., & Estes, L. *itsdm*: Isolation Forest-based presence-only species distribution modeling and explanation in R. In *2022 ESA Annual Meeting (August 14-19)*. ESA.

Song, L., Estes, L., Luo, B., Estes, A., A super-ensemble approach to map land cover types with high resolution over data-sparse African savanna landscapes, in *the 4th International Electronic Conference on Remote Sensing (25-27 January 2022)*, online, **Best Poster Award**

Song, L., Estes, L., Luo, B., Estes, A., Land cover mapping in data-sparse regions, in *NASA Biological Diversity and Ecological Forecasting Team Meeting (October 19-21, 2021)*, online

Song, L., Luo, B., Ye, S., Zhang, Q., & Estes, L. D. (2020, December). Using mixed labels and a multi-stage approach to map crop types over smallholder-dominated agricultural systems. In *AGU Fall Meeting Abstracts* (Vol. 2020, pp. GC034-04).

Song, L., & Estes, L. Broad-scale spatial distribution of African bush elephant (Loxodonta Africana) using combination of machine learning algorithms. In *2020 ESA Annual Meeting (August 3-6)*. ESA.

TECHNOLOGY AND SOFTWARE DEVELOPMENT

Primary author

itsdm: An R package to use an interpretable Isolation Forest model for species distribution modeling.

hrlcm: A high resolution land cover mapping workflow of using ensemble labels, Random Forest, and U-Net.

sentinelPot: A python package to pre-processing Sentinel-1&2 level-1 images.

waspire: A template to build docker image to run WASP (Weighted Average Synthesis Processor) to create cloud-free syntheses with Sentinel-2 level-2A.

cscdc: Crop type detection and classification in Africa using multi-source images.

Co-author

labeller: Labelling platform for Mapping Africa active learning project.

learner: Machine learning component of the active learning project.

imager: A repo to prepare PlanetScope images for labelling platform and modeling.

PROFESSIONAL EXPERIENCE

2021	Instructor, *Geospatial Analysis with R*, Clark University, Spring
2018 – 2020	Graduate Research Assistant, Clark University, Worcester, USA *Mapping Africa project*
2020	Graduate Teaching Assistant, *Geospatial Analysis with R*, Clark University, Spring
2017	Graduate Teaching Assistant, *Introduction to Remote Sensing*, Clark University, Fall
2012 - 2015	Graduate Research Assistant, Nanjing University of Information Science & Technology, Nanjing, CHINA
2015	Graduate Teaching Assistant, *Principles of Remote Sensing*, Nanjing University of Information Science & Technology, Spring
2014	Graduate Teaching Assistant, *IDL programming*, Nanjing University of Information Science & Technology, Fall

CERTIFICATES AND WORKSHOPS

2018	Harmonized UAS techniques: Introduction to data acquisition and preprocessing
2018	Specialization 'Data Science: Foundations using R Specialization' on Coursera
2017	Specialization 'Python for Everybody' on Coursera

SERVICE

2019	Promotion Committee, Graduate School of Geography, Clark University

PROFESSIONAL AFFILIATIONS

American Association of Geographers (AAG)
American Geophysical Union (AGU)
The Ecological Society of America (ESA)
British Ecological Society (BES)
North American Regional Association of the International Association for Landscape Ecology (IALE)
International Society for Ecological Modeling (ISEM)

KEY TOOLS

Programming	Strong knowledge of R and Python Familiar with JavaScript, Julia and IDL
Platforms	Strong knowledge of Amazon Web Services, Git and GitHub, Docker, and Google Earth Engine
Applications	ArcGIS Software, QGIS, GRASS GIS, ENVI, IDRISI/TerrSet