

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