**GUANYUAN SHUAI**

Department of Earth and Environmental Sciences, MSU

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**EDUCATION**

**Michigan State University 2016.8 – present**

**Department of Earth and Environmental Sciences, Ph.D.**

* Concentration: Sustainable Agriculture, Crop modelling, Integration of Remote Sensing and Crop Models.

**Beijing Normal University 2011.9 – 2014.7**

**Resources Science & Technology, M.S**

**Major: Cartography and Geographic Information System (GIS)**

* Concentration: Environmental Model of Remote Sensing, Pattern Recognition, Digital Image Processing, Principles of Terrestrial Ecosystem Ecology.

**Beijing Normal University 2007.9 – 2011.7**

**Resources Science & Engineering, B. S**

* Concentration: Geology and Mineral Resources Science, Climate Resources, Science of Water Resources, General Ecology, Principle of Remote Sensing, Principle of GIS.

**RESEARH INTEREST**

* Simulating soil organic carbon and greenhouse gas emissions at various scales using remote sensing techniques and crop simulation models
* Mapping conservation agriculture practices and assessing their impacts on sustainable crop production, resilience, and environmental outcomes. This includes evaluations of yield stability at field-scale under different management practices
* Understanding dynamic spatial-temporal variability in crop conditions at subfield scales

**RESEARCH** **EXPERIENCE**

Department of Earth and Environmental Sciences, Michigan State University, East Lansing MI

Research Assistant Aug. 2016-present

Advisor: Dr. Bruno. Basso

* **Crop yield variability analysis:** My research activities focus on analyze crop yield variability across large spatial and temporal scales using both remote sensing images and ground yield data. A recent yield variability analysis is performed for corn and soybean in U.S. Corn Belts in recent 8 years. The consequent environmental and economic losses are also included based on the yield variability information. The ultimate goal of my research is to provide ideas for better understanding and predicting crop yield in agricultural ecosystems.
* **Linking remote sensing and crop simulation models:** There have been numerous researches focusing on integrating RS and CSMs at regional or global scales. With the advances of drone techniques, field-scale monitoring becomes more and more popular. However, there have been little work done to explore the spatial and temporal variations of crop productivity and yield in the growing season through the integration of RS and CSMs. Therefore, my research interest is to find the major contributing factors of these variations and propose real-time management practices that deal with spatiotemporal variations.

**Resources Science & Technology, Beijing Normal University, Beijing, China**

Graduate student Aug. 2011-June. 2016

Advisor: Dr. Jinshui Zhang

* **Agricultural remote sensing**:I also satellite imagery to extract crop distribution and to monitor crop growth. I participated in several important programs related to research and application of remote Sensing technology in Chinese agricultural statistics, and my contributions include three parts:

1. Explored the potential of SVDD in one-class land-cover classification in order to meet the need of many applications which focus on only one class. Such applications include specific crop, impervious surface or wetland. Proposed ways to collect informative training samples and test samples to improve the accuracy of SVDD.
2. Integrated PolSAR and optical images to detect the major crop in Northern China. Proposed method to combine the advantages of multi-sensor imagery for extracting the target crop.
3. Developed an improved segmentation method for high-resolution Unmanned Aerial Vehicle (UAV) image based on object-oriented classification and parcel data.

**PUBLICATIONS**

1. B. Basso, **G. Shuai**, J. Zhang, and G. P. Robertson, “Yield stability analysis reveals sources of large-scale nitrogen loss from the US Midwest,” *Scientific Reports*, 2019, 9(1): 1-9.
2. **G. Shuai**, RA. Martinez-Feria, J. Zhang, S. Li, R. Price, and B. Basso, “Capturing Maize Stand Heterogeneity Across Yield-Stability Zones Using Unmanned Aerial Vehicles (UAV),” Sensors, 2019, 19(20): 4446.
3. **G. Shuai**, J. Zhang, B. Basso, Y. Pan, X. Zhu, S. Zhu, and H. Liu, “Multi-temporal RADARSAT-2 polarimetric SAR for maize mapping supported by segmentations from high-resolution optical image,” *International Journal of Applied Earth Observation and Geoinformation*, 2019, 74: 1-15.
4. J. Zhang, B. Basso, R. Price, G. Putman, and **G. Shuai**, “Estimating plant distance in maize using Unmanned Aerial Vehicle (UAV),” *PloS one*, 2018, 13(4): e0195223.
5. **G. Shuai**, J. Zhang, L. Deng, and X. Zhu, “Edge-pixels-based support vector data description for specific land-cover distribution mapping,” *Journal of applied remote sensing*, 2015, 9(1): 096034-096034.
6. J. Zhang, **G. Shuai**\*, L. Liu, Y. Pan, and H. Liu, “Optimized parameters determined from window-based validation data set for the support vector domain description model to map specific land cover,” submitted. (\* : corresponding author)
7. J. Zhang, Z. Zhou, **G. Shuai**\*, A. Stanton, and H. Liu, “Supported vector data description method to map Beijing and Tianjin city group urban distribution from NPP-VIIRS nightlights and NDVI,” submitted.
8. **G. Shuai**, J. Zhang, Y. Pan and Z. Yuan, “Multi-temporal Radarsat-2 polarimetric SAR classification based on finer optical image segmented parcels to map corn distribution,” ready to submit.
9. **G. Shuai**, S. Zhu, J. Zhang, X. Xiu, and G. Liu, “SVDD-based land-cover mapping using optimal parameters via single window flexible pace search method,” *IGARSS 2013:* *IEEE International Geoscience and Remote Sensing Symposium*, Melbourne, 4277-4280.
10. J. Zhang, S. Zhu, X. Zhu, and **G. Shuai**, “Prior-knowledge-based spectral mixture analysis for impervious surface mapping,” *International Journal of Applied Earth Observation and Geoinformation*, 2014, 28: 201-210.
11. J. Zhang, S. Zhu, X. Zhu, **G. Shuai**, and D. Xie, “Improving sampling efficiency of crop acreage estimation using wheat planting rule from historical remote sensing,” *Journal of Applied Remote Sensing*, 2014, 8(1): 083663-083663.

**Professional Experience**

2018 workshop “Emerging Technologies and Methods in Earth Observation for Agricultural Monitoring”, oral presenter

2017 IGARSS, poster presenter

2013 IGARSS, oral presenter