Shengjie Liu

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EDUCATION

2015 – 2019	**Sun Yat-Sen University**, Guangzhou, China
	B.S. in Geographic Information Science (GPA: 3.9/4.0)
	Thesis: Deep learning for land use and land cover classification

WORK EXPERIENCE

Oct 2019 – Present   **The University of Hong Kong**, Pokfulam, Hong Kong
Research Assistant**,** Department of Physics
- Investigated artificial light at night and light pollution in Hong Kong using satellite and night sky brightness data

Jul – Aug 2019   **OneSpace Technology Co., Ltd.**, Chongqing, China
Remote Sensing Engineer, Department of Spatial Information
- Applied satellite data for crop mapping, and water and air quality assessment (e.g., chlorophyll a, PM2.5)
- Reduced the need of human annotation and was the key to a three million project about crop mapping in Chongqing

Oct 2017 – Apr 2019   **Guangdong Key Lab. of Urbanization and Geo-simulation**, Guangzhou, China
Undergraduate Research Assistant (Part-time)
- Developed machine learning methods for remote sensing image classification with limited samples
- Methods: convolutional neural network, multitask learning, active learning, object-based image analysis
- Applications: land use and crop mapping, local climate zone, hyperspectral and PolSAR classification

Jul 2017 – Dec 2018   **School of Geography and Planning**, Sun Yat-Sen University, Guangzhou, China
Assistant Lab Manager (Part-time), GIS Lab
- Maintained 82 computers and 2 multimedia systems for classes

Jun – Aug 2016   **Center of Social Survey**, Sun Yat-Sen University, Zhuhai, China
Interviewer (Internship), China Labor-force Dynamic Survey
- Conducted face-to-face interviews about job and migration history with 70 families in two communities

JOURNAL PUBLICATIONS

Liu, S., Shi, Q., and Zhang, L., 2020. Few-shot Hyperspectral Image Classification with Unknown Classes Using Multitask Deep Learning. *IEEE Transactions on Geoscience and Remote Sensing*, Early Access, 2020. doi:10.1109/TGRS.2020.3018879

Liu, S., Luo, H., and Shi, Q., 2020. Active Ensemble Deep Learning for Polarimetric Synthetic Aperture Radar Image Classification. *IEEE Geoscience and Remote Sensing Letters*, Early Access, 2020. doi:10.1109/LGRS.2020.3005076

Liu, S., and Shi, Q., 2020. Local Climate Zone Mapping as Remote Sensing Scene Classification Using Deep Learning: A Case Study of Metropolitan China. *ISPRS Journal of Photogrammetry and Remote Sensing*, 164, 229-242, 2020. doi:10.1016/j.isprsjprs.2020.04.008

Liu, S., and Shi, Q., 2020. Multitask Deep Learning with Spectral Knowledge for Hyperspectral Image Classification. *IEEE Geoscience and Remote Sensing Letters*, Early Access, 2020. doi:10.1109/LGRS.2019.2962768

Liu, S., Qi, Z., Li, X., and Yeh, A.G.O., 2019. Integration of Convolutional Neural Networks and Object-Based Post-Classification Refinement for Land Use and Land Cover Mapping with Optical and SAR Data. *Remote Sensing*, 11(6), p.690. doi:10.3390/rs11060690

PEER-REVIEWED CONFERENCE PROCEEDINGS

Liu, S., Luo, H., Tu, Y., He, Z., and Li, J., 2018. Wide Contextual Residual Network with Active Learning for Remote Sensing Image Classification. In *IEEE International Geoscience and Remote Sensing Symposium,* July 2018, pp. 7145-7148. doi:10.1109/IGARSS.2018.8517855

CONFERENCE ABSTRACTS AND PRESENTATIONS

Shengjie Liu, 2020. Deep learning for remote sensing image classification: Scene classification of local climate zone and fine-grained classification with unknown classes. In *3rd Urban Remote Sensing Symposium*, November 2020, Shanghai, China. Chun Shing Jason PUN, Chu Wing SO, Nok Yan Janet CHANG, **Shengjie LIU**, Lina CANAS, Constance E. WALKER, and Sze Leung CHEUNG, 2020. A Multinational Study of Night Sky Brightness patterns: preliminary results from the Globe at Night – Sky Brightness Monitoring Network (GaN-MN). In *6th International Conference on Artificial Light at Night (ALAN)*, June 2020, Lleida, Catalonia, Spain.

WORKING PAPERS

Shengjie Liu, Chu Wing So, Janet Chang, Jason Pun et al. Understanding remotely sensed nighttime lights with field measurements and land use data: A case study of Hong Kong.
Shengjie Liu, Zhize Zhou, Qian Shi. Crop Mapping Using Sentinel Full-year PolSAR Data and a CPU Optimized Convolutional Neural Network with Two Sampling Strategies. Submitted to *International Journal of Remote Sensing* on 22 Jun 2020.

HONORS AND AWARDS

2020	Arctic Code Vault Contributor, GitHub
Nov 2019	Second Price (5 000 CNY), The 1st Orbita Hyperspectral Satellite Data Processing Paper Contest
	- Estimating PM2.5 and PM10 directly from TOA reflectance using hyperspectral data and multitask learning
Dec 2018	Scholarship of the EMBA Alumni Association for Real Estate of Sun Yat-Sen University
Dec 2018	The First Prize of Excellent Undergraduate Scholarship, Sun Yat-Sen University

PROFESSIONAL ACTIVITIES AND SERVICES

2020 –	Reviewer for *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing, Pattern Recognition Letters, Urban Climate.*
2018 –	Member, IEEE Geoscience and Remote Sensing Society

SKILLS

Coding languages: Python, C/C++, MATLAB, HTML5, LaTeX
Coding in Python: TensorFlow, Keras, PyTorch, NetworkX, Matplotlib
Academic software: GeoDa, ArcGIS, QGIS, ENVI, eCognition, Gephi, OriginLab
General software and games: VideoPad Video Editor, Adobe Illustrator, *SimCity 4*, *Cities: Skylines*

SELECTED PAST PROJECTS

2019   **Local climate zone mapping in metropolitan China**
- Developed an artificial network named LCZNet to classify satellite scene images to local climate zone
- Created local climate zone maps in fifteen major cities in China
- Responsible for conceptualization, methodology, analysis, investigation, manuscript writing and editing
- Project page: https://sjliu.me/lcz

2019   **Estimating PM2.5 and PM10 directly from TOA reflectance using Zhuhai-1 hyperspectral data**
- Developed a Python script to covert raw Zhuhai-1 hyperspectral data to Top-of-Atmosphere reflectance
- Developed a multitask artificial network to simultaneously predict PM2.5 and PM10 concentration

- Project page: http://sjliu.me/Estimation-of-PM2.5-PM10-from-Satellite-Imagery

2018   **Using DMSP/OLS nighttime light data to capture the collapse and rise of post-Soviet states**
- Funded by National Undergraduate Innovative Project (No. 201810558050, 10 000 CNY)
- Found that most light-decreased areas are related to mining industries based on spatial analysis
- Identified the sources of decreased night lights in fifteen post-Soviet countries by classifying high-resolution Google satellite images and locating their latitude and longitude in DMSP/OLS data
- Responsible for proposal writing, conceptualization, methodology, analysis, investigation, presentation

2018   **Cost-effective remote sensing image classification**
- Developed a light-weight convolutional network that can run on CPU for image classification
- Integrated the light-weight network with active learning to reduce the need of training samples
- Responsible for methodology, analysis, investigation, manuscript writing

2018   **Studying the urban expansion of Zhuhai city, China**
- Analyzed the urban expansion pattern of Zhuhai using spatial analysis (Local Moran's I)
- Identified Zhuhai as a polycentric city
- Responsible for investigation

2018   **Urban structure discovery in the Pearl River Delta**
- Discovered urban structure in the Pearl River Delta using mobile GPS data with complex network analysis and community detection (Gephi, NetworkX, Fast-unfolding algorithm)
- Explored the distribution of diseases with online medical records using complex network analysis and clustering analysis
- Identified urban functional zones in Guangzhou and Foshan

2017   **Community detection with open street map road network and graph theory** (Class Project)
- Developed a C++ program to calculate the shortest path using Dijkstra algorithm without external libraries (linked list implementation)
- Developed a label propagation algorithm with real distance constraint for community detection
- Evaluated the performance of community detection by calculating modularity
- Visualized the detected road network community in ArcGIS

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