

# Shengjie Liu

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## Current position

*Doctoral Student*, University of Southern California

## Areas of specialisation

Remote Sensing, Machine Learning

## Education

- 2021- PhD in *Population, Health and Place*, University of Southern California
- 2019 BSc in *Geographical Information Science (Remote Sensing)*, Sun Yat-Sen University

## Publications & talks

### JOURNAL ARTICLES

- 2023 **Liu, Shengjie**, An-Min Wu, and Hung Chak Ho (2023). [Spatial variability of diurnal temperature range and its associations with local climate zone, neighborhood environment and mortality in Los Angeles](#). *Urban Climate* 49, 101526
- 2022 Kyba, Christopher CM, Martin Aubé, Salvador Bará, Andrea Bertolo, Constantinos A Bourousis, Stefano Cavazzani, Brian R Espey, Fabio Falchi, Geza Gyuk, Andreas Jechow, Miroslav Kocifaj, Zoltán Kolláth, Héctor Lamphar, Noam Levin, **Shengjie Liu**, Steven D Miller, Sergio Ortolani, Chun Shing Jason Pun, Salvador José Ribas, Thomas Ruhtz, Alejandro Sánchez de Miguel, Matthias Schneider, Ranjay Man Shrestha, Alexandre Simoneau, Chu Wing So, Tobias Storch, Kai Pong Tong, Diane Turnshek, Ken Walczak, Jun Wang, Zhuosen Wang, and Jianglong Zhang (2022). [Multiple Angle Observations Would Benefit Visible Band Remote Sensing Using Night Lights](#). *Journal of Geophysical Research: Atmospheres* 127(12), e2021JD036382
- 2021 **Liu, Shengjie**, Zhize Zhou, Huaxiang Ding, Yuanjun Zhong, and Qian Shi (2021). [Crop Mapping Using Sentinel Full-Year Dual-Polarized SAR Data and a CPU-Optimized Convolutional Neural Network With Two Sampling Strategies](#). *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing* 14, 7017-7031

- 2021 **Liu, Shengjie**, Qian Shi, and Liangpei Zhang (2021). Few-shot Hyperspectral Image Classification with Unknown Classes Using Multitask Deep Learning. *IEEE Transactions on Geoscience and Remote Sensing* 59(6), 5085–5102
- 2021 **Liu, Shengjie**, Haowen Luo, and Qian Shi (2021). Active Ensemble Deep Learning for Polarimetric Synthetic Aperture Radar Image Classification. *IEEE Geoscience and Remote Sensing Letters* 18(9), 1580–1584
- 2020 **Liu, Shengjie**, and Qian Shi (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 **Liu, Shengjie**, and Qian Shi (2020). Multitask Deep Learning With Spectral Knowledge for Hyperspectral Image Classification. *IEEE Geoscience and Remote Sensing Letters* 17(12), 2110–2114
- 2019 **Liu, Shengjie**, Zhixin Qi, Xia Li, and Anthony Gar-On Yeh (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), 690

#### CONFERENCE PROCEEDINGS

- 2023 **Liu, Shengjie**, Chu Wing So, Hung Chak (Derrick) Ho, Qian Shi, and Jason C.S. Pun (2023). Using high-resolution nighttime remote sensing data to identify light sources in Hong Kong. Accepted to *IGARSS 2023*
- 2023 **Liu, Shengjie**, Chu Wing So, Xiang Feng Foo, and Jason C.S. Pun (2023). Using multisource data to capture the impacts of Earth Hour 2021: A case study of Hong Kong. Accepted to *IGARSS 2023*
- 2022 **Liu, Shengjie**, and Qian Shi (2022). Estimating PM<sub>2.5</sub> and PM<sub>10</sub> on Zhuhai-1 hyperspectral imagery. *IGARSS 2022*, 5933–2936
- 2021 **Liu, Shengjie**, Chu Wing So, and Jason C.S. Pun (2021). Analyzing long-term artificial light at night using VIIRS monthly product with land use data: Preliminary result of Hong Kong. *IGARSS 2021*, 6821–6824
- 2021 **Liu, Shengjie**, and Qian Shi (2021). Multi-label local climate zone mapping as scene classification using very high resolution imagery: Preliminary result of Hong Kong. *IGARSS 2021*, 6809–6812
- 2018 **Liu, Shengjie**, Haowen Luo, Ying Tu, Zhi He, and Jun Li (2018). Wide contextual residual network with active learning for remote sensing image classification. *IGARSS 2018*, 7145–7148

#### CONFERENCE ABSTRACTS

presenter marked with \*

- 2022 **Liu, Shengjie\***, Chu-Wing So, Hung Chak Ho, Qian Shi, and Jason C.S. Pun (2022). Disproportionate distribution of artificial light at night in Hong Kong: evidence from space with high-resolution nighttime remote sensing. *Advanced Urban Remote Sensing Workshop*, Hong Kong, December 2022
- 2022 Pun, Jason C.S., Chu Wing So\*, **Shengjie Liu**, Lina Canas, Constance E. Walker, and Sze Leung Cheung (2022). Measurement of cloud amplification effect over a wide range of night sky brightness observations with the GaN-MN. *LPTMM 2022*, Santiago de Compostela, Galicia, Spain, June 2022
- 2022 Pun, Jason C.S., Chu Wing So, and **Shengjie Liu\*** (2022). Analyzing the sources and variations of night lights between 2012 and 2019 in Hong Kong from VIIRS monthly products. *LPTMM 2022*, Santiago de Compostela, Galicia, Spain, June 2022
- 2021 **Liu, Shengjie\***, Chu Wing So, and Jason C.S. Pun (2021). Analyzing the sources and variations

- of night lights between 2012 and 2019 in Hong Kong from VIIRS monthly products. *ALAN 2021*, Lleida, Catalonia, Spain, June 2021
- 2021 Chu Wing So\*, Nok Yan Janet Chang, **Shengjie Liu**, Lina Canas, Constance E. Walker, Sze Leung Cheung, and Jason C.S. Pun (2021). A multinational study of night sky brightness patterns: Preliminary results from the Globe at Night – Sky Brightness Monitoring Network (GaN-MN) of the study of cloud amplification on NSB. *ALAN 2021*, Lleida, Catalonia, Spain, June 2021
- 2020 Pun, Jason C.S. \*, 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). *ALAN 2020*, Lleida, Catalonia, Spain, June 2020

## Grants, honours & awards



- 2023 USC Dornsife PhD Academy Scholarship, US\$500
- 2022 USC Dornsife PhD Academy Scholarship, US\$485
- 2020 Arctic Code Vault Contributor, GitHub
- 2019 Zhuhai Orbita Hyperspectral Data Processing Paper Contest, CNY5,000 (US\$714)
- 2018 IEEE IGARSS Student Travel Grant, US\$1,650
- 2018 Scholarship of SYSU EMBA Alumni Association, CNY3,000 (US\$428)
- 2018 National Undergraduate Innovative Project, CNY10,000 (US\$1,428)

## Research

### PARTICIPATED FUNDED PROJECTS

- 2023 Southern California Environmental Health Sciences Center Pilot Project. PI: Dr Lu Zhang
- 2019-2021 Environment and Conservation Fund of the Government of the Hong Kong Special Administrative Region (2018-125), PI: Dr Jason C.S. Pun. *Effects of external lighting on the environment*
- 2019 HKU Knowledge Exchange Fund, University Grants Committee of Hong Kong (KE-IP-2019/20-54, KE-IP-2020/21-78), PI: Dr Jason C.S. Pun
- 2019 Guangdong Basic and Applied Basic Research Foundation (2019A1515011057), PI: Dr Qian Shi
- 2019 National Natural Science Foundation of China (61976234), PI: Dr Qian Shi
- 2018 National Natural Science Foundation of China (61601522), PI: Dr Qian Shi

### RESEARCH EXPERIENCE

- May 2023 - Present **Graduate research assistant**  
**Division of Biostatistics, Keck School of Medicine, USC**  
 Advisor: [Lu Zhang](#)
  - Developing advanced Gaussian Process methods for spatial data interpolation
- Oct 2019 - Aug 2021 **Research assistant (full-time)**  
**HKU Light Pollution Research, Department of Physics, HKU**  
 Advisor: [Jason Chun Shing Pun](#)
  - Analyzed the relationship between remotely sensed nighttime lights and night sky brightness data measured from sky quality meter
  - Collected and analyzed panoramic 360 imagery for analyzing light pollution ([demo](#))

- Analyzed multi-source open data (traffic camera, weather camera, all-sky camera, panoramic camera, and video recordings) to see the impacts of Earth Hour on external lighting
- Made a [video](#) showing the lights-out phenomenon from HK's unique double-deck tramway

Feb 2018 -  
Jun 2019

#### Research assistant (undergraduate)

[Guangdong Key Laboratory for Urbanization and Geo-simulation](#), SYSU

👤 Advisor: [Qian SHI](#)

- Developed a [multitask deep learning](#) method with spectral knowledge for hyperspectral image classification with limited training samples
- Developed [Active Ensemble Deep Learning](#) for radar remote sensing image classification with limited training samples
- Developed [LCZNet](#) for high-accuracy local climate zone mapping in metropolitan China

Aug 2018 -  
Dec 2018

#### Research assistant (undergraduate)

[Guangdong Key Laboratory for Urbanization and Geo-simulation](#), SYSU

👤 Advisor: [Zhixin Qi](#)

- Developed an object-based deep learning classification method for land cover mapping
- Integrated Sentinel-1 Optical & Sentinel-2 PolSAR data for land cover mapping
- Analyzed urban expansion of Zhuhai 1980-2015 using spatial analysis (Local Moran's I)

Feb 2018 -  
May 2018

#### Research assistant (undergraduate)

[Urbanization Institute](#), Sun Yat-Sen University

👤 Advisor: [Xun Li](#)

- 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

## Work experience

Jul 2019 -  
Aug 2019

#### Remote sensing engineer (full-time)

Department of Spatial Information, [OneSpace Technology Co Ltd](#) (spinoff as [SenSpace China](#))

👤 CIO & Vice President: [Zhize Zhou](#)

- Developed deep learning methods for crop mapping with Sentinel and Gaofen satellite data
- Awarded a project by the Chongqing Agriculture and Rural Committee: "[Digital Map of Agricultural Industry in Yubei District, Chongqing](#)" (CNY3,000,000 = US\$428,000)

Jun 2017 -  
Nov 2019

#### Assistant lab manager (part-time)

[Department of Remote Sensing & GIS](#), Sun Yat-Sen University

- Maintained 82 PC desktops and 2 multimedia systems for GIS Lab
- Provided tech support for ArcGIS, ENVI, & eCognition

Jul 2017

#### Assistant (part-time)

[ENVI/IDL Remote Sensing Summer School](#), Guangzhou

- Supported ENVI/IDL software training with ESRI ENVI/IDL senior engineer
- Participants including professors & postdocs from major Chinese universities

Jun 2016 -  
Aug 2016

#### Interviewer (internship)

[China Labor-force Dynamics Survey \(CLDS\)](#), Center of Social Survey, SYSU

👤 Project PI: [Yucheng Liang](#), 👤 Team Leader: [Haiwei Guo](#)

- Conducted computer-assisted personal interview for China Labor-force Dynamics Survey

- Covered 140 families in 4 communities

## Teaching

### LAB INSTRUCTOR & TEACHING ASSISTANT

- 2023 SSCI-382 Geographic Information Science: Spatial Analytics (Rating: 4.0/4.0)  
 2023 SSCI-220 Spatial Data Collection Using Drones (Rating: 4.0/4.0)  
 2022 SSCI-165 Sustainability Science in the City (Rating: 3.59/4.0)

## Service & membership

### CONFERENCE

- 2023 Session Chair, [Hyperspectral Imaging Classification](#), IGARSS 2023

### GUEST LECTURE

- 2022 University of Southern California, SSCI-382 Geographic Information Science: Spatial Analytics, *Urban Heat Islands with Nighttime and Daytime Landsat Imagery*

### JOURNAL REVIEWER

- IEEE Geoscience and Remote Sensing Letters (2)  
 IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (14)  
 IEEE Transactions on Geoscience and Remote Sensing (3)  
 Knowledge-Based Systems (3)  
 Pattern Recognition Letters (2)  
 Remote Sensing Letters (3)  
 Scientific Reports (2)  
 Urban Climate (12)

### MEMBERSHIP

- American Society for Photogrammetry and Remote Sensing  
 Atmospheric Environmental Remote Sensing Society  
 IEEE Geoscience and Remote Sensing Society (GRSS)  
 IEEE GRSS Image Analysis and Data Fusion (IADF) Technical Committee

## Skills & software

- Deep learning: Pytorch, TensorFlow, Keras  
 Coding: Python, MATLAB, Julia, R, ENVI-IDL, HTML5, L<sup>A</sup>T<sub>E</sub>X  
 Software: QGIS, ArcGIS, GeoDa, OriginLab, Gephi, ENVI, eCognition, ESA-SNAP