Shengjie Kris Liu

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Current position

Doctoral Student, University of Southern California

Research interests

Remote Sensing, Machine Learning, Spatial Statistics

Education and experience

2021-	PhD in *Population, Health and Place*, University of Southern California
2019-2021	RA of *Light Pollution*, Department of Physics, The University of Hong Kong
2015-2019	BSc in *Geographical Information Science*, Sun Yat-Sen University

Publications

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 Bouroussis, 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 Ho, Qian Shi, and Jason C.S. Pun (2023). Using high-resolution nighttime remote sensing data to identify light sources in Hong Kong. *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. *IGARSS 2023*

2022 **Liu, Shengjie**, and Qian Shi (2022). Estimating PM2.5 and PM10 on Zhuhai-1 hyperspectral imagery. *IGARSS 2022*, 5933-5936

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 *

2023 **Liu, Shengjie***, Chu Wing So, Hung Chak Ho, Qian Shi, and Jason Chun Shing Pun (2023). High inequality of artificial light due to commercial and sports lighting in Hong Kong. *ALAN 2023*, Calgary, Alberta, Canada, August 2023

2023 So, Chu Wing*, **Shengjie Liu**, and Jason Chun Shing Pun (2023). Association between indoor lux measurements and outdoor wall brightness in the high-rise urban environment of Hong Kong. *ALAN 2023*, Calgary, Alberta, Canada, August 2023

2023 Pun, Jason Chun Shing*, Chu Wing So, Xiang Feng Foo, and **Shengjie Liu** (2023). Using multisource data to capture the impacts of Earth Hour 2021 in Hong Kong. *ALAN 2023*, Calgary, Alberta, Canada, August 2023

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). The relationship between night sky brightness and remote sensing data: Preliminary result from Luojia-1 and the International Space Station. *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

Talks

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 2022*, The University of Hong Kong, Hong Kong, December 2022

2020 **Liu, Shengjie*** (2020). Two cases of deep learning remote sensing image classification: local climate zone mapping and fine-grained classification considering unknown classes. *The 3rd Urban Remote Sensing Workshop*, East China Normal University, Shanghai, China, October 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, CN¥5,000 (US$714)

2018 IEEE IGARSS 2018 Student Travel Grant, US$1,650

2018 Scholarship of SYSU EMBA Alumni Association, CN¥3,000 (US$428)

2018 National Undergraduate Innovative Project, CN¥10,000 (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

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**)
CTO & 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" (CN¥3,000,000 =US$428,000)

Jun 2017 - Nov 2019	**Assistant lab manager (part-time)**

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

University of Southern California

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

Guest lecture

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

Service & membership

Conference

2023   Session Chair, Hyperspectral Imaging Classification, IGARSS 2023

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 (13)

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, LaTeX
Software: QGIS, ArcGIS, GeoDa, OriginLab, Gephi, ENVI, eCognition, ESA-SNAP

Last updated: August 19, 2023