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ACADEMIC TRAINING

- Ph.D. Population, Health and Place, University of Southern California, 2021-26 (expected)
R.A. Research Assistant of Light at Night, The University of Hong Kong, 2019-21
B.S. Geographic Information Science, Sun Yat-Sen University, 2015-19

RESEARCH INTERESTS

I use spatial data to study our Earth, urban climate and its impacts on health, and light at night. My diverse interests are across three research communities, with keywords below.

1. Artificial Intelligence for Earth Observation: with special focus on few-shot, multitask, and open-set learning.
2. Climate and Health: with special focus on intracity temperature-related mortality/morbidity.
3. Light at Night: connection between ground and space observations; multi-angle and multi-resolution.

PUBLICATIONS

Manuscript(s) under Review

- 2022 **Liu, S.**, A.-M. Wu, H.C. Ho. "Spatial variability of diurnal temperature range and its associations with local climate zone, neighborhood environment and mortality in Los Angeles." Submitted to *Urban Climate*, under review.

Journal Articles

- 2022 Kyba, C.C.M., M. Aubé, S. Bará, A. Bertolo, C.A. Bouroussis, S. Cavazzani, B.R. Espey, F. Falchi, G. Gyuk, A. Jechow, M. Kocifaj, Z. Kolláth, H. Lamphar, N. Levin, **S. Liu**, S.D. Miller, S. Ortolani, C.S.J. Pun, S.J. Ribas, T. Ruhtz, A.S. de Miguel, M. Schneider, R.M. Shrestha, A. Simoneau, C.W. So, T. Storch, K.P. Tong, M. Tuñón, D. Turnshek, K. Walczak, J. Wang, Z. Wang, and J. Zhang. "Multiple Angle Observations Would Benefit Visible Band Remote Sensing Using Night Lights." *Journal of Geophysical Research: Atmospheres*, 127, e2021JD036382. doi:10.1029/2021JD036382
- 2021 **Liu, S.**, Z. Zhou, H. Ding, Y. Zhong, and Q. Shi. "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, pp. 7017-7031. doi:10.1109/JSTARS.2021.3094973
- 2021 **Liu, S.**, Q. Shi, and L. Zhang. "Few-shot hyperspectral image classification with unknown classes using multitask deep learning." *IEEE Transactions on Geoscience and Remote Sensing*, 59(6), pp. 5085-5102. doi:10.1109/TGRS.2020.3018879
- 2021 **Liu, S.**, H. Luo, and Q. Shi. "Active Ensemble Deep Learning for Polarimetric Synthetic Aperture Radar Image Classification." *IEEE Geoscience and Remote Sensing Letters*, 18(9), pp. 1580-1584. doi:10.1109/LGRS.2020.3005076
- 2020 **Liu, S.**, and Q. Shi. "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, pp. 229-242. doi:10.1016/j.isprsjprs.2020.04.008

- 2020 **Liu, S.**, and Q. Shi. "Multitask Deep Learning With Spectral Knowledge for Hyperspectral Image Classification." *IEEE Geoscience and Remote Sensing Letters*, 17(12), pp. 2110-2114. doi:10.1109/LGRS.2019.2962768
- 2019 **Liu, S.**, Z. Qi, X. Li, and A.G.-O. Yeh. "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

Conference Proceedings

- 2022 **Liu, S.**, and Q. Shi. "Estimating PM_{2.5} and PM₁₀ on Zhuhai-1 Hyperspectral Imagery." *Proceedings of IEEE International Geoscience and Remote Sensing Symposium IGARSS*, 2022, pp. 5933-5936. doi:10.1109/IGARSS46834.2022.9884493
- 2021 **Liu, S.**, C.W. So, and C.S.J. Pun. "Analyzing Long-Term Artificial Light at Night Using Viirs Monthly Product with Land Use Data: Preliminary Result of Hong Kong." *Proceedings of IEEE International Geoscience and Remote Sensing Symposium IGARSS*, 2021, pp. 6821-6824. doi:10.1109/IGARSS47720.2021.9553915
- 2021 **Liu, S.**, and Q. Shi. "Multi-Label Local Climate Zone Mapping as Scene Classification Using Very High Resolution Imagery: Preliminary Result of Hong Kong." *Proceedings of IEEE International Geoscience and Remote Sensing Symposium IGARSS*, 2021, pp. 6809-6812. doi:10.1109/IGARSS47720.2021.9553086
- 2018 **Liu, S.**, H. Luo, Y. Tu, Z. He, and J. Li. "Wide Contextual Residual Network with Active Learning for Remote Sensing Image Classification." *Proceedings of IEEE International Geoscience and Remote Sensing Symposium IGARSS*, 2018, pp. 7145-7148. doi:10.1109/IGARSS.2018.8517855

Conference Abstracts

presenter marked with *

- 2022 **Liu, S.***, C.W. So, H.C. Ho, Q. Shi, C.S.J. Pun. "Disproportionate distribution of artificial light at night in Hong Kong: evidence from space with high-resolution nighttime remote sensing." In *Advanced Urban Remote Sensing Workshop*, December 2022, HKSAR, China.
- 2022 Pun, C.S.J., C.W. So*, **S. Liu**, L. Canas, C.E. Walker, and S.L. Cheung. "Measurement of cloud amplification effect over a wide range of night sky brightness observations with the GaN-MN." In *LPTMM - Light Pollution Theory Modeling and Measurement*, June 2022, Santiago de Compostela, Galicia, Spain. Link at <http://lptmm.org/>
- 2022 Pun, C.S.J., C.W. So, and **S. Liu***. "Analyzing the Sources and Variations of Night Lights Between 2012 and 2019 in Hong Kong from VIIRS Monthly Products." In *LPTMM - Light Pollution Theory Modeling and Measurement*, June 2022, Santiago de Compostela, Galicia, Spain. Link at <http://lptmm.org/>. Practice recording at <https://youtu.be/Soy66x1Gdzk>
- 2021 **Liu, S.***, C.W. So, and C.S.J. Pun. "The relationship between night sky brightness and remote sensing data: Preliminary result from Luojia-1 and the International Space Station." In *7th International Conference on Artificial Light at Night (ALAN)*, June 2021, Lleida, Catalonia, Spain. Link at <http://artificiallightatnight.org>. Practice recording at <https://youtu.be/5P36sON7m3s>
- 2021 So, C.W.*, N.Y.J. Chang, **S. Liu**, L. Canas, C.E. Walker, S.L. Cheung, and C.S.J. Pun. "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." In *7th International Conference on Artificial Light at Night (ALAN)*, June 2021, Lleida, Catalonia, Spain. Link at <http://artificiallightatnight.org>
- 2020 Pun, C.S.J.*, C.W. So, N.Y.J. Chang, **S. Liu**, L. Canas, C.E. Walker, and S.L. Cheung. "A Multinational Study of Night Sky Brightness Patterns: Preliminary Results from the Globe at Night – Sky Brightness Monitoring Network (GaN-MN)." In *8th International Conference on Artificial Light at Night (ALAN)*, June 2020, Lleida, Catalonia, Spain. Link at <http://artificiallightatnight.org>

GRANTS, AWARDS, AND FELLOWSHIPS

- 2022 Investigating urban heat islands and diurnal temperature range in Los Angeles with Landsat imagery and a thermal camera. USC Dornsife PhD Academy Scholarship and Research Fund Award, 485 USD
- 2019 The First Orbita Hyperspectral Data Processing Paper Contest, Second Prize, 5000 CNY (714 USD)
- 2018 IEEE Geoscience and Remote Sensing Society IGARSS Student Travel Grant, 1650 USD
- 2018 Scholarship of the EMBA Alumni Association for Real Estate of Sun Yat-Sen University, 3000 CNY (428 USD)
- 2018 Using DMSP/OLS night lights to capture the collapse and rise of post-Soviet states. National Students' Innovation and Entrepreneurship Training Program, No. 201810558050, 10,000 CNY (1428 USD)

INVITED TALKS AND GUEST LECTURES

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

TEACHING

- 2023 Lab Instructor and TA, SSCI-382 Geographic Information Science: Spatial Analytics, University of Southern California, Spring 2023
- 2023 Lab Instructor and TA, SSCI-220 Spatial Data Collection Using Drones, University of Southern California, Spring 2023
- 2022 Lab Instructor and TA, SSCI-165 Sustainability Science in the City, University of Southern California, Fall 2022

SERVICE

Academic Journal Peer Review

IEEE Geoscience and Remote Sensing Letters

IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing

IEEE Transactions on Geoscience and Remote Sensing

Knowledge-Based Systems

Pattern Recognition Letters

Remote Sensing Letters

Scientific Reports

Urban Climate

Memberships

American Association of Geographers

American Society for Photogrammetry and Remote Sensing

IEEE Geoscience and Remote Sensing Society (GRSS)

IEEE GRSS Image Analysis and Data Fusion (IADF) Technical Committee

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