

FANGZHENG LYU

DEPARTMENT OF GEOGRAPHY AND GEOGRAPHIC INFORMATION SCIENCE · UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

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Education

University of Illinois Urbana-Champaign

Urbana, IL

PH.D. GEOGRAPHY AND ENVIRONMENTAL STUDIES

2024

- Dissertation Title: An Integrated CyberGIS and Machine Learning Framework for Data-Intensive Urban Analytics
- Advisor: Dr. Shaowen Wang

University of Illinois Urbana-Champaign

Urbana, IL

M.S. GEOGRAPHY

2021

University of Hong Kong

Hong Kong

B.E. COMPUTER ENGINEERING

2018

- Minor in Statistics and Math
- First Division Honor
- Advisor: Dr. Tak-Wah Lam

Northwestern University

Evanston, IL

STUDENT EXCHANGE

2016

University of California, Berkeley

Berkeley, CA

STUDENT EXCHANGE

2015

Research Interests

Geospatial Data Science; Computational Science; Urban Informatics; CyberGIS; Remote Sensing

Publications (An underline denotes a student advisee)

JOURNALS

- Jin, X., Yang, J., Yue, W., Wang, S., Yang, D., Xiao, X., Xue, B., Dou, Y., **Lyu, F.**, Wang, S. (2023). Coastal areas to interior areas: global economic evolution pattern and mechanism. *Humanities and Social Sciences Communications*. 10, 723 DOI: 10.1057/s41599-023-02234-4
- Li, X., Ma, X., **Lyu, F.**, and Song, Y. (2023). Examine the environmental inequity impact of urban heat mitigation on redlining legacy: case study of Charlotte from 2001 to 2020. *Frontiers in Environmental Science*. DOI: 10.3389/fenvs.2023.1218819
- Su, H., Kang, J., **Lyu, F.**, Baig, F., Smilovsky, D., Park, J., Wang, S. (2023). A CyberGIS Approach to Exploring Neighborhood-level Social Vulnerability for Disaster Risk Management. *Transactions in GIS*. DOI: 10.1111/tgis.13106 .
- Park, J., Michels, A., **Lyu, F.**, Han, S., Wang, S. (2023). Daily changes in spatial accessibility to intensive care unit (ICU) beds and their relationship with the case-fatality ratio of COVID-19 in the state of Texas, USA. *Applied Geography*, 102929, ISSN 0143-6228, DOI: 10.1016/j.apgeog.2023.102929.
- Lyu, F.**, Wang, S., Han, S., Wang, S. (2022, Volume 1, Issue 1). An Integrated CyberGIS and Machine Learning Framework for Fine-Scale Prediction of Urban Heat Island Using Satellite Remote Sensing and Urban Sensor Network Data. *Urban Informatics* 1, 6. DOI: 10.1007/s44212-022-00002-4
- Wu, S., Qi, J., Yan, Z., **Lyu, F.**, Lin, T., Wang, Y., Du, Z. (2022). Spatiotemporal assessments of nutrients and water quality in coastal areas using remote sensing and a spatiotemporal deep learning model. *International Journal of Applied Earth Observation and Geoinformation*. Volume 112, 2022, 102897, ISSN 1569-8432, DOI: 10.1016/j.jag.2022.102897
- Chen, X., Wang, S., Li, H., **Lyu, F.**, Liang, H., Zhang, X., Zhong, Y. (2022). Ndist2vec: Node with Landmark and New Distance to Vector Method for Predicting Shortest Path Distance along Road Networks. *ISPRS International Journal of Geo-Information*. 2022; 11(10):514. DOI: 10.3390/ijgi11100514

- Wang, C., **Lyu, F.**, Wu, S., Wang, Y., Xu, L., Zhang, F., Wang, S., Wang, Y., Du, Z. (2022). A deep trajectory clustering method based on sequence-to-sequence autoencoder model. *Transaction in GIS*, 26, 1801– 1820. DOI: 10.1111/tgis.12905
- Lyu, F.**, Xu, Z., Ma, X., Wang, S., Li, Z., Wang, S. (2021). A vector-based method for drainage network analysis based on LiDAR data. *Computers and Geosciences*, 2021, 104892, ISSN 0098-3004. DOI:10.1016/j.cageo.2021.104892
- Kang, JY., Michels, A., **Lyu, F.**, Wang, S., Agbodo, N., Freeman, V., Wang, S. (2020). Rapidly measuring spatial accessibility of COVID-19 healthcare resources: a case study of Illinois, USA. *International Journal of Health Geographics* 19, 36. DOI: 10.1186/s12942-020-00229-x

BOOK CHAPTERS

- Lyu, F.**, Kang, JY., Wang, S., Han, SY., Li Z., and Wang S. (2021). Multi-scale CyberGIS Analytics for Detecting Spatiotemporal Patterns of COVID-19. In: Shaw SL., Sui D. (eds) *Mapping COVID-19 in Space and Time*. Human Dynamics in Smart Cities. Springer, Cham. DOI: 10.1007/978-3-030-72808-3_11
- Wang, S., **Lyu, F.**, Wang, S., Catlet, C., Padmanabhan, A., Soltani, K. (2021). Integrating CyberGIS and Urban Sensing for Reproducible Streaming Analytics. *Urban Informatics*, ISBN 978- 981-15-8983-6. Springer Singapore. DOI:10.1007/978-981-15-8983-6_36

PEER-REVIEWED CONFERENCE PROCEEDINGS

- Lyu, F.**, Ma, X., Song, Y., Zhu, E., Wang, S. (2023). Large-scale Google Street View Images for Urban Change Detection. *I-GUIDE Forum 2023*. DOI: 10.5703/1288284317674
- Lyu, F.**, Yang, Z., Xiao, Z., Diao, C., Park, J., Wang, S. (2022). CyberGIS for Scalable Remote Sensing Data Fusion. In: *Proceedings of Practice and Experience in Advanced Research Computing* (PEARC22), Association for Computing Machinery, New York, NY, USA, Article 35, 1–4. DOI: 10.1145/3491418.3535145
- Padmanabhan, A., Yin, D., **Lyu, F.**, Wang, S. (2019). Bridging Local Cyberinfrastructure and XSEDE with CyberGIS-Jupyter. In: *Proceedings of Practice and Experience in Advanced Research Computing* (PEARC19), Chicago, Illinois, USA. DOI: 10.1145/3332186.3332205
- Lyu, F.**, Yin, D., Padmanabhan, A., Choi, Y., Goodall, J., Castronova, A., Tarboton, D., Wang, S. (2019). Reproducible Hydrological Modeling with CyberGIS-Jupyter: A Case Study on SUMMA. In: *Proceedings of Practice and Experience in Advanced Research Computing* (PEARC19), Chicago, Illinois, USA. DOI: 10.1145/3332186.3333052

Presentations

ORAL PRESENTATIONS

- Lyu, F.** (2023). Urban Heat Measurement with CyberGIS and Large-scale Geospatial Data. *Guest Lecturer, GEOG228. Urban Geography, The University of North Carolina at Chapel Hill, Chapel Hill, NC.*
- Lyu, F.**, Ma, X., Song, Y., Zhu, E., Wang, S. (2023). Large-Scale Google Street View Images for Urban Change Detection. *I-GUIDE Forum 2023, New York City, NY.*
- Lyu, F.**, Zhou, L., Park, J., Baig, F., Wang, S. (2023). Mapping Real-time Heat Exposure with Social Media Data. *2023 AAG Annual Meeting, Denver, CO.*
- Lyu, F.** (2022). An Integrated CyberGIS and Machine Learning Framework for Fine-scale and Real-time Understanding of Urban Heat Dynamic. *UIUC GIS colloquium, Urbana, IL.*
- Lyu, F.**, Yang, Z., Xiao, Z., Diao, C., Park, J., Wang, S. (2022). CyberGIS for Scalable Remote Sensing Data Fusion. *PEARC22, Boston, MA.*
- Lyu, F.**, Wang, S., Han, SY., Catlett, C., and Wang, S. (2022). Fine-Scale Prediction of Urban Heat Island Using Satellite Remote Sensing and Urban Sensor Network Data. *2022 AAG Annual Meeting. Virtual*
- Lyu, F.**, Xu, Z., Ma, X., Wang, S., Li, Z., and Wang, S. (2019). Vector-Based Drainage Direction Analysis for High-Resolution Digital Elevation Models. *2019 AAG Annual Meeting, Washington, D.C.*
- Lyu, F.**, Yin, D., Padmanabhan, A., Choi, Y., Goodall, J., Castronova, A., Tarboton, D., and Wang, S. (2019). Reproducible Hydrological Modeling with CyberGIS-Jupyter: A Case Study on SUMMA. *PEARC19, Chicago, IL.*

POSTER PRESENTATIONS

- Lyu, F.**, Xu, Z., Ma, X., Wang, S., Li, Z., and Wang, S. (2023). A vector-based method for drainage network analysis based on LiDAR data. *SESE Research Review, Urbana, IL*.
- Lyu, F.**, Wang, S. Han, SY., Catlett, C, and Wang, S. (2022). An integrated cyberGIS and machine learning framework for fine-scale prediction of Urban Heat Island using satellite remote sensing and urban sensor network data. *2022 Geo-Resolution Conference. Saint Louis, MO*.
- Lyu, F.**, Xu, Z., Ma, X., Wang, S., Li, Z., and Wang, S. (2022). A vector-based method for drainage network analysis based on LiDAR data. *I-GUIDE AHM, Chicago, IL*.
- Lyu, F.**, Yin, D., Padmanabhan, A., and Wang, S. (2019). Reproducible Hydrological Modeling with CyberGIS-Jupyter. *2019 GIS Day in UIUC, Urbana, IL*.

Teaching Experiences

Instructor	2022 Summer
GGIS105 - THE DIGITAL EARTH, UIUC	
Teaching Assistant	2022 Spring
GGIS407 - FOUNDATIONS OF CYBERGIS & GEOSPATIAL DATA SCIENCE, UIUC	
Instructor	2021 Fall
GGIS507 - HIGH-PERFORMANCE GEOSPATIAL COMPUTING, UIUC	

Fellowships and Scholarships

George Beatty Fellowship	2023 - 2024
UNIVERSITY OF ILLINOIS	
HKU Foundation Scholarship for Outstanding Student	2015 - 2018
UNIVERSITY OF HONG KONG	
HKU Worldwide Undergraduate Student Exchange Scholarship	2017
UNIVERSITY OF HONG KONG	
Soong Ching-ling Scholarship	2014 - 2018
SHANGHAI SOONG CHING LING FOUNDATION	

Awards

Finalist, AAG-GISS Student Paper Competition	2022
ASSOCIATION OF AMERICAN GEOGRAPHERS	
Finalist, AAG Robert Raskin Student Competition	2019
ASSOCIATION OF AMERICAN GEOGRAPHERS	
First Division Honor	2018
UNIVERSITY OF HONG KONG	
Dean's Honor List	2017
UNIVERSITY OF HONG KONG	
Walter Brown Memorial Prizes in Mathematics	2015
UNIVERSITY OF HONG KONG	
Reaching Out Award	2015
HKSAR GOVERNMENT SCHOLARSHIP FUND	
First Prize at Zhejiang Physics Olympiad	2013
ZHEJIANG PHYSICAL SOCIETY	

Professional Experiences

Graduate Research/Teaching Assistant

DEPARTMENT OF GEOGRAPHY AND GIS · UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

2018 - 2023

Software Engineer Intern

L3 BIOINFORMATICS LIMITED · HONG KONG SAR

2017

Undergraduate Research Assistant

DEPARTMENT OF COMPUTER SCIENCE · UNIVERSITY OF HONG KONG

2017

Software Engineer Intern

NETEASE, INC · HANGZHOU, CHINA

2016

Professional Services

Reviewer · *IEEE Transactions on Big Data; Environmental Modelling & Software; Transactions in GIS; The Egyptian Journal of Remote Sensing and Space Sciences; Journal of Spatial Information Science; Geo-spatial Information Science***Director** · *AAG CyberInfrastructure Specialty Group, 2023-2025***Organizer** · *AAG 2024 Symposium on Geospatial Data Science for Sustainability, 2024***Session Chair** · *AAG 2023 Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: CyberGIS and High-Performance Geospatial Computing, 2023***Committee Member** · *2023 School of Earth, Society, and Environment (SESE) Research Review, UIUC, 2023***Student Advised** · Eric Zhu, B.S. student in Computer Science, UIUC, 2022 - present; Lixuanwu Zhou, M.S. student in geography and GIS, UIUC, 2021 - 2023**Mentor** · *2019 AAG-UCGIS Summer School, UIUC, 2019*

Technical Skills

Programming Language · *Python · C++ · R · Linux · HTML***Computing System** · *HPC · Docker · Slurm***Software** · *ArcGIS · ENVI · Wolfram Mathematica*