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Education

PhD candidate in Photogrammetry and Remote Sensing	2020 - 2025
Wuhan University, State Key Laboratory of Information Engineering in Surveying,	Wuhan, China
Mapping and Remote Sensing	
Adviser: Prof. Hongyan Zhang \mathscr{O} , Prof. Wei He \mathscr{O} , and Prof. Liangpei Zhang \mathscr{O}	
B.E. in Communication Engineering	2016 – 2020
Wuhan University, Department of electronic information	Wuhan, China
Adviser: Prof. Guangyi Yang 🖉	

Research Interests

My research focuses on combining advanced deep-learning models with multi-source remote-sensing data to solve Earth observation issues, such as **large-scale high-resolution land-cover mapping, building function mapping, vegetation analysis, peat volume estimation**, etc. My prior work overcame the limitations of insufficient annotated/ field observation labels in large-scale mapping and produced several first-hand fine-scale thematic maps, laying a vital foundation for downstream analysis. In the future, I am interested in combining my background in computer vision and large-scale fine-scale mapping to solve specific ecological and environmental challenges.

First-author Publications

Learning without Exact Guidance: Updating Large-scale High-resolution Land Cover Maps from Low-resolution Historical Labels & Zhuohong Li, Wei He, Jiepan Li, Fangxiao Lu, Hongyan Zhang IEEE/CVF Computer Vision and Pattern Recognition (CVPR) Highlight paper (TOP 2.6%)	2024
SinoLC-1: the first 1-meter resolution national-scale land-cover map of China created with the deep learning framework and open-access data <i>&</i> <u>Zhuohong Li</u> , Wei He, Mofan Cheng, Jingxin Hu, Guangyi Yang, Hongyan Zhang Earth System Science Data (ESSD) ESI Highly Cited Paper (citation: 81 in one year) <i>&</i>	2023
Breaking the resolution barrier: A low-to-high network for large-scale high-resolution land-cover mapping using low-resolution labels <i>©</i> <u>Zhuohong Li</u> , Hongyan Zhang, Fangxiao Lu, R. Xue, Guangyi Yang, Liangpei Zhang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	2022
The outcome of the 2021 IEEE GRSS data fusion contest—Track MSD: Multitemporal semantic change detection ∂ <u>Zhuohong Li</u> , Hongyan Zhang,, Caleb Robinson, Nikolay Malkin, Nebojsa Jojic, Pedram Ghamisi, Ronny Hänsch, Naoto Yokoya IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing (JSTARS)	2021
Generalized Few-Shot Meets Remote Sensing: Discovering Novel Classes in Land Cover Mapping via Hybrid Semantic Segmentation Framework & Zhuohong Li, Fangxiao Lu, Jiaqi Zou, Lei Hu, Hongyan Zhang IEEE/CVF Computer Vision and Pattern Recognition (CVPR) Workshops Won first place in the 2024 CVPR OpenEarthMap Land-cover Mapping Challenge	2024
Identifying every building's function in large-scale urban areas with multi-modality remote-sensing data & <u>Zhuohong Li</u> , Wei He, Jiepan Li, Hongyan Zhang 2024 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	2024

Multi-stage pseudo-label iteration framework for semi-supervised land-cover mapping \mathscr{O}	2022
<u>Zhuohong Li</u> , Jiaqi Zou, Fangxiao Lu, Hongyan Zhang	
2022 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	
Won second place in the 2022 IEEE GRSS Data Fusion Contest	
Change cross-detection based on label improvements and multi-model fusion for multi-temporal remote sensing images 🔗	2021
<u>Zhuohong Li</u> , Fangxiao Lu, Hongyan Zhang, Guangyi Yang, Liangpei Zhang	
<u>Zhuohong Li</u> , Fangxiao Lu, Hongyan Zhang, Guangyi Yang, Liangpei Zhang 2021 IEEE International Geoscience and Remote Sensing Symposium (IGARSS)	

Preprint & Working on

Satellites map every building's function in urban China revealing huge city-life inequality

Topic: We map every single building's function (e.g., residential, commercial, industry, and public health) in China (~400 million buildings in total) with 97TB of multi-modal data, analyzing and answering "How we can measure the city-life inequality in China from the building-level analysis?"

Preprint Author: <u>Zhuohong Li*</u>, Linxin Li*, Liangpei Zhang, Wei He, and Hongyan Zhang (Preparing to **Nature Cities** in Nov. 2024)

EurasiaLC-1: The first 1-meter resolution land-cover map covering the entire Eurasian continent

Topic: Based on **340TB** of 1-m remote-sensing data and global 10-m land-cover maps (e.g., ESA_WorldCover), we created a weakly supervised deep-learning framework to produce <u>the first 1-m land-cover map that can cover the entire Eurasian continent</u> and address the resources and ecological issues over the area. **Progress:** I have been leading a **ten-person group** to conduct the mapping since Dec 2023, and we plan to finish in Jan 2025).

Determining the spatial heterogeneity of peatland layer thickness over large-scale area

Topic: Peatlands take only 3% of the Earth's land area but contain 30% of the world's soil carbon. We combined the machine learning methods and a large number of field observation data to <u>estimate peat volume in the Zoige basin</u> of the Qinghai-Tibet Plateau (over 4600 km2 area).

Progress: I am currently working with **Prof. Peng Gao** *⊘* (Syracuse University) and **Prof. Giorgos Mountrakis** *⊘* (State University of New York) to assess the potential, but significant adverse effects of peat degradation due to climate change and human disturbance on the natural environment. (<u>It starts in Feb 2024 and plans to finish in Dec 2024</u>).

Awards

IEEE/CVF CVPR OpenEarthMap Challenge—First place winner (1/58) <i>Awarded in Seattle, USA</i> Topic: <u>Generalized few-shot in Earth observation</u> (discover novel land-cover classes with limited samples).	2024
IEEE GRSS Data Fusion Contest—First place winner (1/47) ∂ Awarded in Brussels, Belgium Topic: <u>Weak-supervised segmentation in Earth observation</u> (high-resolution change detection with weak, low-resolution labeled samples).	2021
IEEE GRSS Data Fusion Contest—Second place winner (2/115) ∅ Awarded in Kuala Lumpur, Malaysia Topic: <u>Semi-supervised segmentation in Earth observation</u> (Nationwide land-cover mapping in France with extremely limited labels).	2022
IEEE WHISPER Cross-city Multimodal Semantic Segmentation Challenge—Second place winner (2/65) Awarded in Athens, Greece Topic: <u>Semi-supervised segmentation in Earth observation</u> (Cross-city land-cover mapping with multispectral image and SAR).	2023
ISPRS remote-sensing image segmentation challenge—Third place (3/109) Awarded in Shandong, China Topic: Multi-class segmentation using sub-meter level remote-sensing images.	2020
Graduate First-class Scholarship of Wuhan University Received first-class scholarships three times in the State Key Laboratory of Surveying, Mapping, and Remote Sensing Information Engineering. <i>Ranking third (2021), first (2022)</i> <i>and second (2023) among all students, respectively.</i>	2021 – 2023

project team, Apple, and ServiceNow.

Collaborative Publications

Harmony in diversity: Content cleansing change detection framework for very-high-resolution remote-sensing images Mofan Cheng, Wei He, <u>Zhuohong Li</u> , Guangyi Yang, and Hongyan Zhang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	2024
Overcome the Uncertainty Challenges in Detecting Building Changes from Remote Sensing Images Jiepan Li, Wei He, <u>Zhuohong Li</u> , Yujun Guo, Hongyan Zhang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	2024
Cross-City Semantic Segmentation (C2Seg) in Multimodal Remote Sensing: Outcome of the 2023 IEEE WHISPERS C2Seg Challenge Yuheng Liu, Ye Wang, Yifan Zhang, Shaohui Mei, Jiaqi Zou, <u>Zhuohong Li</u> ,, Hao Li, Gemine Vivone, Ronny Hänsch, Gulsen Taskin, Jing Yao, A Kai Qin, Bing Zhang, Jocelyn Chanussot, Danfeng Hong IEEE Journal of Selected Topics in Applied Earth Observations and RS (JSTARS)	2024
Can spatial heterogeneity of peatland layer thickness be determined over large area? Peng Gao*, <u>Zhuohong Li*</u> , Anwesha Majumdar, Giorgos Mountrakis, and Zhiwei Li Preprint to "American Geophysical Union (AGU) Fall Meeting 2024"	2024
Conference Oral Presentation	
Identifying every building's function in large-scale urban areas with multi-modality remote-sensing data IEEE Geoscience and Remote Sensing Symposium (IGARSS)	07/2024 Athens, Greece
Identifying every building's function in large-scale urban areas with multi-modality remote-sensing data IEEE Geoscience and Remote Sensing Symposium (IGARSS) Generalized Few-Shot Meets Remote Sensing: Discovering Novel Classes in Land Cover Mapping via Hybrid Semantic Segmentation Framework IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR) Workshop	07/2024 Athens, Greece 06/2024 Seattle, USA
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Skills & Self-description

Specific skills: I am skilled in organizing multi-source geoscience data, for example,
(1) <u>Airborne/spaceborne image:</u> Landsat/Sentinel/NAIP/SGDSAT-1 (nighttime-light)/Planet/Google imagery;
(2) <u>Map & GIS data</u>: NLCD/ESA_WorldCover/OpenStreetMap/Soil organic carbon/Bulk Density map/DEM; and developing efficient machine-learning models to produce fine-scale Earth observation products for practical problems (e.g., land resources, urban management, and ecology).

Self-description: I have a great passion for my research, with enthusiasm and self-motivation. At the same time, as a professional soccer player (national second-level athlete), I actively seek teamwork and have the determination to overcome difficulties not only in sports but also in life and research.