

Junjue Wang

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Research Interests

My interests include multi-modal remote sensing processing and computer vision, focusing on creative datasets and algorithms for various applications, such as large-scale land-cover mapping, rural/urban planning, landslide detection. In the future, I hope to develop large multi-modal models (foundation models, instruction-tuning models, etc) for specific Earth science applications.

Professional Experience

Project Researcher

The University of Tokyo 🔗

Collaborative professor: Prof. Naoto Yokoya

08/2024 – Present

Kashiwa, Japan

Education

Ph.D candidate in Photogrammetry and Remote Sensing

Wuhan University 🔗

Adviser: Prof. Yanfei Zhong & Prof. Liangpei Zhang

2019 – 2024

Wuhan, China

B.E. in Surveying and Mapping Engineering

China University of Geosciences 🔗

Adviser: Prof. Fang Fang & Prof. Yaqin Ye

2015 – 2019

Wuhan, China

First-Author Publications

DisasterM3: A Remote Sensing Vision-Language Dataset for Disaster Damage Assessment and Response 🔗

2025

Junjue Wang, Weihao Xuan, Heli Qi, Zhihao Liu, Kunyi Liu, Yuhan Wu, Hongruixuan Chen, Jian Song, Junshi Xia, Zhuo Zheng, Naoto Yokoya
The Thirty-Ninth Annual Conference on Neural Information Processing Systems

DynamicVL: Benchmarking Multimodal Large Language Models for Dynamic City Understanding 🔗

2025

Weihao Xuan(Co-first author), **Junjue Wang(Co-first author)**, Heli Qi, Zihang Chen, Zhuo Zheng, Yanfei Zhong, Junshi Xia, Naoto Yokoya
The Thirty-Ninth Annual Conference on Neural Information Processing Systems

CityVLM: Towards sustainable urban development via multi-view coordinated vision-language model 🔗

2025

Junjue Wang, Weihao Xuan, Heli Qi, Zihang Chen, Hongruixuan Chen, Zhuo Zheng, Junshi Xia, Yanfei Zhong, Naoto Yokoya
ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)

Cross-sensor domain adaptation for high spatial resolution urban land-cover mapping: From airborne to spaceborne imagery 🔗

2022

Junjue Wang, Ailong Ma, Yanfei Zhong, Zhuo. Zheng, and Liangpei Zhang
Remote Sensing of Environment (RSE)
ESI Highly Cited Paper (WOS citation: 47)

RSNet: The Search for Remote Sensing Deep Neural Networks in Recognition Tasks 🔗

2021

Junjue Wang, Yanfei Zhong, Zhuo Zheng, and Liangpei Zhang
IEEE Transactions on Geoscience and Remote Sensing (TGRS)
ESI Highly Cited Paper (WOS citation: 75)

EarthVQANet: Multi-task visual question answering for remote sensing image understanding 🔗

2024

Junjue Wang, Ailong Ma, Zihang Chen, Zhuo Zheng, Yuting Wan, Liangpei Zhang, and Yanfei Zhong
ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS)


LoveDA: A Remote Sensing Land-Cover Dataset for Domain Adaptive Semantic Segmentation ↗	2021
Junjue Wang, Zhuo Zheng, Ailong Ma, and Yanfei Zhong 35th Annual Conference on Neural Information Processing Systems (NeurIPS Datasets & Benchmarks Track)	
EarthVQA: Towards Queryable Earth via Relational relational-based Remote Sensing Visual Question Answering ↗	2024
Junjue Wang, Zhuo Zheng, Zihang Chen, Ailong Ma, Yanfei Zhong Proceedings of the AAAI Conference on Artificial Intelligence (AAAI2024)	
LoveNAS: Towards Multi-Scene Land-Cover Mapping via Hierarchical Searching Adaptive Network ↗	2024
Junjue Wang, Yanfei Zhong, Ailong Ma, Zhuo Zheng, Yuting Wan, Liangpei Zhang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	
FactSeg: Foreground Activation Driven Small Object Semantic Segmentation in Large-Scale Remote Sensing Imagery ↗	2022
Ailong Ma, Junjue Wang (<i>Corresponding Author</i>), Yanfei Zhong, Zhuo Zheng IEEE Transactions on Geoscience and Remote Sensing (TGRS)	

Collaborative Publications

Remote sensing meta modal representation for missing modality land cover mapping: From EarthMiss dataset to MetaRS method ↗	2026
Yanfei Zhou, Ailong Ma, Junjue Wang, Zihang Chen, Yanfei Zhong Remote Sensing of Environment (RSE)	
Seeing is Believing, but How Much? A Comprehensive Analysis of Verbalized Calibration in Vision-Language Models	2025
Weihao Xuan, Qingcheng Zeng, Heli Qi, Junjue Wang, Naoto Yokoya Conference on Empirical Methods in Natural Language Processing (EMNLP) 2025 Oral	
BRIGHT: A globally distributed multimodal building damage assessment dataset with very-high-resolution for all-weather disaster response	2025
Hongruixuan Chen, Jian Song, Olivier Dietrich, Clifford Broni-Bediako, Weihao Xuan, Junjue Wang, Xinlei Shao, Yimin Wei, Junshi Xia, Cuiling Lan, Konrad Schindler, Naoto Yokoya Earth System Science Data (ESSD)	
Foundation models for remote sensing and earth observation: A survey ↗	2025
Aoran Xiao, Weihao Xuan, Junjue Wang, Jiaying Huang, Dacheng Tao, Shijian Lu, Naoto Yokoya IEEE Geoscience and Remote Sensing Magazine (GRSM)	
FarSeg++: Foreground-Aware Relation Network for Geospatial Object Segmentation in High Spatial Resolution Remote Sensing Imagery	2023
Zhuo Zheng, Yanfei Zhong, Junjue Wang, Ailong Ma, Liangpei Zhang IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)	
Domain Adaptive Land-Cover Classification via Local Consistency and Global Diversity	2023
Ailong Ma, Chenyu Zheng, Junjue Wang, and Yanfei Zhong IEEE Transactions on Geoscience and Remote Sensing (TGRS)	
E2SCNet: Efficient Multiobjective Evolutionary Automatic Search for Remote Sensing Image Scene Classification Network Architecture	2022
Yuting Wan, Yanfei Zhong, Ailong Ma, Junjue Wang, and Liangpei Zhang IEEE Transactions on Neural Networks and Learning Systems (TNNLS)	
TypeFormer: Multiscale transformer with type controller for remote sensing image caption	2022
Zihang Chen, Junjue Wang, Ailong Ma, and Yanfei Zhong IEEE Geoscience and Remote Sensing Letters (GRSL)	
The Outcome of the 2022 Landslide4Sense Competition: Advanced Landslide Detection From Multisource Satellite Imagery	2022
Omid Ghorbanzadeh, Yonghao Xu, Hengwei Zhao, Junjue Wang, Yanfei Zhong, Dong Zhao, Qi Zang, Shuang Wang, Fahong Zhang, Yilei Shi, Xiao Xiang Zhu, Lin Bai, Weile Li, Weihang Peng, Pedram Ghamisi	

Building damage assessment for rapid disaster response with a deep object-based semantic change detection framework: From natural disasters to man-made disasters Zhuo Zheng, Yanfei Zhong, Junjue Wang , Ailong Ma, and Liangpei Zhang Remote Sensing of Environment (RSE)	2021
SceneNet: Remote sensing scene classification deep learning network using multi-objective neural evolution architecture search Ailong Ma, Yuting Wan, Yanfei Zhong, Junjue Wang , and Liangpei Zhang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	2021
Cross-domain road detection based on global-local adversarial learning framework from very high resolution satellite imagery Xiaoyan Lu, Yanfei Zhong, Zhuo Zheng, Junjue Wang ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)	2021
Foreground-aware relation network for geospatial object segmentation in high spatial resolution remote sensing imagery Zhuo Zheng, Yanfei Zhong, Junjue Wang , and Ailong Ma IEEE/CVF Computer Vision and Pattern Recognition (CVPR)	2020

Awards

AI for Earthquake Response Challenge (1 st place)  Topic: Development of AI algorithms for global building damage assessment	2025
Graduate Academic Innovation First Prize, Wuhan University The highest honor for graduate students of Wuhan University.	2022
IJCAI LandSlide4Sense CDCEO workshop Challenge (1 st place) Topic: multimodal global landslide detection.	2022
Ali Tianchi Real World Image Forgery Localization Challenge (1st place, 1/1149) Topic: certificate and file forgery detection, AI security.	2022
IEEE GRSS Data Fusion Contest, Track: Multitemporal Semantic Change Detection Track: weakly-supervised multitemporal semantic change detection	2021
SpaceNet 6 EarthVision workshop challenge at CVPR 2020 (Top Graduate Award, 1/411) Topic: missing-modality all-weather mapping	2020
xView2 Challenge (4th place, 4/3500+) Topic: global building damage assessment	2019
IEEE GRSS Data Fusion Contest (2nd place) Track: single-view semantic 3D challenge	2019
Outstanding Graduate of China University of Geosciences	2019
Excellent Freshman Award of Wuhan University Top10 students per year	2019
Outstanding Undergraduate Thesis Award Top 5% of undergraduates	2019
Outstanding Undergraduate Thesis Award (Top 5% of undergraduates)	2018
9th National University GIS Skills Development Competition (1st Place)	2018
5th National University Surveying and Mapping Skills Competition (First Prize) Track: programming with C++	2018

Academic Projects

National key research and development program (2022YFB3903404), Research backbone
"Self-learning remote sensing big data fusion real-time processing and transmission software and hardware platform", response for studying multi-modal remote sensing fusion analysis algorithms to integrate heterogeneous data (RGB, SAR, multispectral, text description, etc.), reasoning about the spatial semantic relationships between objects to assist Rural/Urban planning (water sources around the agriculture, traffic situations, etc).

National key research and development program (2017YFB0504202), Research backbone

"Real-time processing technology of land resources and ecological environment security emergency information", response for studying cross-regional and cross-sensor land-cover mapping, landslide disaster detection algorithms, such as cross-sensor domain adaptive model for global landslide detection.

National Natural Science Foundation of China Excellent Youth Fund, Research backbone

"Hyperspectral Remote Sensing, Object Recognition, and Scene Understanding", responsible for designing a task-driven framework considering data characteristics (hyperspectral and multi-spatial resolutions, etc) to automate architecture design.

Engineering Applications

FactSeg Project: Advancing Small Objects Mapping in Large-Scale Remote Sensing Images [↗](#)

We held a thesis recurrence competition and the code of FactSeg was included in PaddleRS [↗](#) (Baidu).

LoveDA Project: Advancing Large-Scale Land Cover Mapping in Urban and Rural Areas [↗](#)

I organized the collection, labeling, and validation of the LoveDA dataset. I maintain Land-cover Segmentation [↗](#), Urban-Rural Domain Adaptation [↗](#) competitions on CodaLab [314 participants]. Official code was included in TorchGeo [↗](#) (Microsoft), and MMCV [↗](#) (SenseTime).

Academic Service

Journal Reviewer

IEEE IEEE Transactions on Geoscience and Remote Sensing (TGRS)

Visual Computer

Remote Sensing

Remote Sensing Letters

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

International Journal of Remote Sensing (IJRS)

Section Editor for "Medical Imaging Process & Technology"

Conference Reviewer

Conference on Neural Information Processing Systems (NeurIPS) 2021-2024

IEEE Computer Vision and Pattern Recognition Conference (CVPR) 2022

IEEE International Conference on Computer Vision (ICCV) 2023

Invited Talks

High Resolution Remote Sensing Intelligent Interpretation

11/2022

Wuhan University, Geoscience Cafe #346

CapFormer: Pure Transformer for Remote Sensing Image Caption

07/2022

IEEE Geoscience and Remote Sensing Symposium, Student paper competition

Progressive Label Refinement-Based Distribution Adaptation Framework for Landslide Detection

07/2022

31st International Joint Conference On Artificial Intelligence (IJCAI), champion plan sharing

LoveDA: A Remote Sensing Land-Cover Dataset for Domain Adaptive Semantic Segmentation

12/2021

35th Annual Conference on Neural Information Processing System (NeurIPS)

Skills

Multi-modal data processing: Sentinel-2/Landsat/WorldView/QuickBird/GF-2/Capella

Remote sensing software: ArcGIS/QGIS/ENVI

Programming languages: Python/Matlab/C++/JavaScript

Deep Learning Framework: PyTorch/TensorFlow