

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, Zuo 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, Zuo 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, Zuo 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, Zuo 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, Zuo 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

2024

Adaptive Network

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 (Corresponding Author)**, 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:

2026

From EarthMiss dataset to MetaRS method

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**, Jiaxing 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 2021
Zhuo Zheng, Yanfei Zhong, Junjue Wang, Ailong Ma, and Liangpei Zhang
Remote Sensing of Environment (RSE)

SceneNet: Remote sensing scene classification deep learning network using multi-objective neural evolution architecture search 2021
Ailong Ma, Yuting Wan, Yanfei Zhong, Junjue Wang, and Liangpei Zhang
ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)

Cross-domain road detection based on global-local adversarial learning framework from very high resolution satellite imagery 2021
Xiaoyan Lu, Yanfei Zhong, Zhuo Zheng, Junjue Wang
ISPRS Journal of Photogrammetry and Remote Sensing (ISPRS P&RS)

Foreground-aware relation network for geospatial object segmentation in high spatial resolution remote sensing imagery 2020
Zhuo Zheng, Yanfei Zhong, Junjue Wang, and Ailong Ma
IEEE/CVF Computer Vision and Pattern Recognition (CVPR)

Awards

AI for Earthquake Response Challenge (1st place) 2025
Topic: Development of AI algorithms for global building damage assessment

Graduate Academic Innovation First Prize, Wuhan University 2022
The highest honor for graduate students of Wuhan University.

IJCAI LandSlide4Sense CDCEO workshop Challenge (1st place) 2022
Topic: multimodal global landslide detection.

Ali Tianchi Real World Image Forgery Localization Challenge (1st place, 1/1149) 2022
Topic: certificate and file forgery detection, AI security.

IEEE GRSS Data Fusion Contest, Track: Multitemporal Semantic Change Detection 2021
Track: weakly-supervised multitemporal semantic change detection

SpaceNet 6 EarthVision workshop challenge at CVPR 2020 (Top Graduate Award, 1/411) 2020
Topic: missing-modality all-weather mapping

xView2 Challenge (4th place, 4/3500+) 2019
Topic: global building damage assessment

IEEE GRSS Data Fusion Contest (2nd place) 2019
Track: single-view semantic 3D challenge

Outstanding Graduate of China University of Geosciences 2019

Excellent Freshman Award of Wuhan University 2019
Top10 students per year

Outstanding Undergraduate Thesis Award 2019
Top 5% of undergraduates

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) 2018
Track: programming with C++

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