

MEILIU WU

Lecturer/Assistant Professor in Geospatial Data Science
School of Geographical & Earth Sciences
University of Glasgow, UK
Web: <https://www.gla.ac.uk/schools/ges/staff/meiliuwu/>

521 Molema Building
Glasgow, G12 8RZ
Tel: +44 073 9696 1627
Email: Meiliu.Wu@glasgow.ac.uk

Research interests

- **Methods:** Geospatial Data Science, GIScience, GeoAI
- **Applications:** Urban Analytics, Transport Resilience, 3D Digital Twin, Human Mobility, Social-Environmental Sustainability, Equity & Justice

EDUCATION

PhD	University of Wisconsin-Madison, Geography Minored in Computer Science	2021/01 – 2024/05
	Thesis: “Towards GeoAI Foundation Models: A Multimodal Learning Framework with Spatial Knowledge”	
	Committee: Drs. Qunying Huang (Chair), Song Gao, Zhou Zhang, Yong Jae Lee	
	Grades: 4.00/4.00	
MS	University of Wisconsin-Madison, GIScience & Cartography	2017/08 – 2019/08
	Thesis: “Human Movement Patterns of Different Racial-Ethnic and Economic Groups in U.S. Top 50 Cities: What Can Social Media Tell Us About Segregation?”	
	Committee: Drs. Qunying Huang (Chair), Song Gao, Robert Roth, David W. Wong	
	Grades: 3.96/4.00	
BS	University of Cincinnati, GIS & Remote Sensing <i>High Degree Honors in Geography & STEM Research</i>	2013/08-2017/08
	Grades: 3.96/4.00	
BS	Sun Yat-Sen University, China, GIS & Remote Sensing 2+2 Undergraduate Program with University of Cincinnati	2013/08-2017/08
	Grades: 4.1/5.0 (ranked 1st/250)	
	Queensland University of Technology, Australia Exchange Program in Urban Planning and Surveying	2015/08-2015/12

RESEARCH/WORK EXPERIENCE

University of Glasgow, Glasgow, UK Lecturer/Assistant Professor in Geospatial Data Science	2024/08 – present
University of Wisconsin-Madison, Madison, WI Research Assistant, Spatial Computing and Data Mining Lab	2021/01 – 2024/05
Beijing Digital Union Network Technology Co., Ltd., Beijing Big Data Mining Engineer, Department of Location-Based Service	2019/08 – 2021/01

NASA Ames Research Center , Mountain View, CA Big Data Scientist	2018/06 – 2018/08
Cincinnati Area Geographic Information System , Cincinnati, OH GIS Developer Intern	2017/01 - 2017/08

GRANTS

2025 UKRI EPSRC & DT Network+ Alan Turing Institute Fund on Transport Resilience Digital Twins Research Projects (DTBOC) – “*Leveraging Digital Twin and AI to Enhance Situational Awareness and Crisis Response for Glasgow’s Transportation*” (£50,000, PI)

2025 UKRI Natural Environment Research Council (NERC) GALLANT Innovation Fund on GOTREES (**Govan Tree**-community for **ecosystem services**) (£60,000, co-I)

2025 University of Glasgow Early Career Rewards for Excellence on Developing Vision-Language Models Enhanced by Geospatial Intelligence (£10,000, PI)

2025 University of Glasgow Early Career Mobility Scheme Award (£5,000, PI)

2024-26 University of Glasgow College of Science and Engineering Start-up Grant on Developing GeoAI Foundation Models (£5,000, PI)

2024 Association of Geographic Information Laboratories in Europe (AGILE) Student Grant (\$1,000)

2023-24 UW-Madison Capstone Ph.D. Teaching Award & Grant (Nominated, \$1,000)

2024 AAG Travel Grant for Geospatial Cyberinfrastructure Workshop: Building High-Performance, Ethical, and Secured Geospatial Software (\$650)

2024 & 2023 AAG Student Travel Award & Grant (Nominated, \$500 each year)

2022 ACM SIGSPATIAL Student Travel Award & Grant (\$1,000)

2021-2024 UW-Madison Trewartha/Odebolt Graduate Research & Travel Award (\$4,000)

2017 University of Cincinnati High Degree Honors in Geography & STEM Research Awards (\$1,000)

2016-2017 University of Cincinnati Undergraduate Global Scholarship (\$28,000)

2015 National Exchange Scholarships (\$9,600, Queensland University of Technology)

2014 Ministry of Education of China National Undergraduate Scholarship (Top 1%) (\$1,600)

HONORS AND AWARDS

2024 (Spring) UW-Madison Commencement Flag bearer of College of Letters & Science for the Doctoral, MFA, and Medical Professional Degree Candidate Ceremony

2023-24 UW-Madison Capstone Ph.D. Teaching Award

2023 University Consortium for Geographic Information Science (UCGIS) Symposium Student Paper Award (1st)

2023 AAG Geographic Information Science and Systems (GISS) Specialty Group Student Honors Paper Award (2nd)

2023 AAG Cyberinfrastructure Specialty Group (CISG) Robert Raskin Student Competition (1st)

2022 AAG Spatial Analysis and Modeling (SAM) Student Competition John Odland Award (2nd)
 2021 International Graduate Workshop on Geoinformatics Best Participation Award
 2021 28th International Conference on Geoinformatics Best Student Paper Award (2nd)

TEACHING EXPERIENCE

University of Glasgow, Scotland, UK 2024/08 - present
Program Director & Lecturer, School of Geographical & Earth Sciences

- **Program Director: designing a new MSc program in Geospatial Data Science & AI** (starting in F26), including courses in *Intro to GeoAI* and *Big GeoData Analytics*;
- **[Planned] Introduction to Geospatial AI**, S27 (In-person);
- **GEOG5015 Web and Mobile Mapping**, S26 (In-person; 30 graduates);
- **GEOG5018 Principles of Cartographic Design & Production**, F24 (In-person; 40 graduates); F25 (In-person; 30 graduates);

Supervisor

- **Zeyu Xiao** (incoming PhD student in Feb 2026). Leveraging Spatially Explicit Graphs, Digital Twinning, and BIM to Enhance Perception, Localisation, and Navigation.
- **Shunyu Yao** (PhD student). Towards Ethical GeoAI: Enhancing Fairness, Privacy, and Interpretability from A Data Perspective. 2025/10 – present.
- **Fengjiao Li** (PhD student). Towards GeoAI-Enhanced Mobility-Based Health Risk Analysis: Embedding Geospatial Intelligence into Graph Neural Networks for Dynamic Population Modelling. 2025/05 – present.
- **Ayush Dabra** (PhD student). The Dynamics of Cities – Enabling Minority Representation in Urban Environments. 2025/01 – present.
- **Yuwei Cai** (PhD student). Super-resolution for Building Datasets Using Deep Learning Methods. 2024/08 – present.
- **Zhimeng He** (PhD student). Advancing Deep Learning Architectures for Urban Data Analysis in 2D and 3D. 2024/09 – present.
- **Yuchen Wang** (PhD student). Sediment Transport of Made Ground along Scottish Sites. 2024/10 – Present.
- **Han Ting** (Visiting PhD student, Sun Yat-sen University) Towards a new era of Geo-Foundation Models. 2025/10 – present.
- **Shiqi Wang** (External PhD student, Hong Kong University of Science and Technology - Guangzhou). Exploring Bias and Heterogeneity in GenAI for Urban Perception. 2024/10 – present.
- **Hanyi Xiong** (Visiting Undergraduate, University of Hong Kong). Enhancing Image Geo-localization via GeoAI-empowered Foundation Models. 2025/2 – present.

University of Wisconsin-Madison, Madison, WI 2017 - 2019, 2021 – 2024
Instructor & Teaching Assistant, Department of Geography
 Avg. teaching rate: 4.5/5.0 (Top 5%)

- *Geog 574 Geospatial Database Design and Development*, F23 & F17 (In-person; 50 graduates & undergraduates); S19 (Online; 50 graduates from UW-Madison GIS Professional Programs)
- *Geog 170 Intro of GIScience and its Technology*, S21 & S24 (Online; 485 undergraduates)
- *Geog 576 Web Interactive Mapping & Geovisualization*, S19 (Online; 50 graduates from UW-Madison GIS Professional Programs)
- *Geog 370 Introduction to Cartography*, F18 (In-person; 80 graduates & undergraduates)
- *Geog 578 GIS Applications*, S18 (In-person; 50 graduates & undergraduates)

Graduate students Advised

- **Mingda Wu**. Pixel-wise Wildfire Burn Severity Classification with Bi-temporal Sentinel-2 Data and Deep Learning. 2022/09 – present.
- **Tang Sui**. Empowering Urban Wildfire Burnt Area Detection with Deep Learning. 2022/08 – present.
- **Yang Qiu**. Using deep learning to predict neighborhood wealthiness based on street view images. 2022/05 – 2024/12.
- **Yuehan Qin**. Big data mining on social media data (tweets) for human mobility using unsupervised machine learning - Latent Dirichlet Allocation Model. 2018/08 – 2019/05

PUBLICATIONS (STUDENTS DIRECTLY SUPERVISED BY ME; #: SAME CONTRIBUTION)

Peer-Reviewed Journal Articles

1. **Wu M.***, Huang Q., Gao S., 2025. Advancing Vision-Language Models with Spatial-Context Prompt Tuning: A Case Study in GeoAI-Empowered Image Geo-Localization. *Journal of Location Based Services*. DOI: 10.1080/17489725.2025.2599302
2. **Wu M.***, Wong D., Huang Q., 2025. Segregation: what is in a name? A review of segregation measurement and a prospective framework. *Spatial Demography*. DOI: 10.1007/s40980-025-00147-1
3. Zhou, S., **Wu, M.**, Ye, X., Silbernagel, J., Hart, D. A., & Huang, Q. (2025). Advancing smart disaster response by leveraging social sensing and mobile technology. *Geo-Spatial Information Science*, 1–19. DOI: 10.1080/10095020.2025.2588034
4. Yang S., Peng B., Sui T., **Wu M.**, Huang Q., 2025. Advancing Self-Supervised Learning for Building Change Detection: Unified Denoising Autoencoder and Contrastive Learning Framework. *Remote Sensing*. DOI: 10.3390/rs17152717
5. Weng Q., et al., 2025. Urban visual-spatial intelligence: Bridging human and sensor perception for sustainable urban development. *npj Urban Sustainability*. DOI: 10.1038/s42949-025-00256-2
6. **Qiu Y.**, **Wu M.**, Huang Q., Kang Y., 2024. Do You Know Your Neighborhood? Integrating Street View Images and Multi-task Learning for Fine-Grained Multi-Class Neighborhood Wealthiness Perception Prediction. *Cities*. DOI: 10.1016/j.cities.2025.105703
7. Sui T., Huang Q., Wu M., **Wu M.**, Zhang Z., 2024. BiAU-Net: Wildfire burnt area mapping using bi-temporal Sentinel-2 imagery and U-Net with attention mechanism. *International Journal of Applied Earth Observation and Geoinformation*. DOI: 10.1016/j.jag.2024.104034

8. Wu M., Huang Q., Gao S., Zhang Z., 2023. Mixed Land Use Measurement and Mapping with Street View Images and Spatial Context-Aware Prompts via Zero-shot Multimodal Learning. *International Journal of Applied Earth Observation and Geoinformation*. DOI: 10.1016/j.jag.2023.103591
9. Wu M., Liu X., Qin Y., Huang Q., 2023. Revealing racial-ethnic segregation with individual experienced segregation indices based on social media data: A case study in Los Angeles-Long Beach-Anaheim. *Computers, Environment and Urban Systems*, 104 (2023): 102008 - 102021. DOI: 10.1016/j.compenvurbsys.2023.102008
10. Vongkusolkit J., Peng B., Wu M., Huang Q., Andresen CG., 2023. Near Real-Time Flood Mapping with Weakly Supervised Machine Learning. *Remote Sensing*. DOI: 10.3390/rs15133263
11. Liu X., Wu M., Peng B., Huang Q., 2022. Graph-based representation for identifying individual travel activities with spatiotemporal trajectories and POI data. *Scientific Reports*. DOI: 10.1038/s41598-022-19441-9
12. Wu, M. Huang, Q., 2022. Human movement patterns of different racial-ethnic and economic groups in U.S. top 50 populated cities: What can social media tell us about isolation? *Annals of GIS*, 28 (2):161-183. DOI: 10.1080/19475683.2022.2026471

Papers Under Review/Revision

13. Wang S., Wu M.*, 2025. AI Meets Human-Urban Interaction: Accuracy Bias and Semantic Heterogeneity in GPT-4 for Global Urban Perception. *Cities*. (Under submission)
14. Yao S., Wu M.*, Wang M., Liu P., 2025. Assessing GPT-4 for Urban Safety Perception: Evidence from Spatial Bias Measurement and Spatial Heterogeneity Understanding. *Transaction in GIS*. (Under submission)
15. He Z., Cai Y., Wu M., Xian X., Barrett B., 2025. Cube-Kernel: Grouped Channel-Convolution for Enhancing Building Rooftop Extraction. *ISPRS Journal of Photogrammetry and Remote Sensing*. (Under review)
16. Cai Y., He Z., Wu M., Barrett B., 2025. MAPSRNet: Super-Resolution Network Surpassing Original High-Resolution Imagery in Building Detection. *ISPRS Journal of Photogrammetry and Remote Sensing*. (Under review)
17. Shingleton J., Basiri A., Bicakci Y.S., Wu M., Turton I., 2025. Geoparsing with Large Language Models: Leveraging the linguistic capabilities of generative AI to improve geographic information extraction. *International Journal of Geographical Information Science*. (Under revision)
18. Yang S., Liu H., Wang X., Wu M., Zhang Z., Yang Z., Huang Q., 2025. A Cyber-agricultural System for Automating Near Real-time Crop Yield Prediction and Dissemination. *Computers and Electronics in Agriculture*. (Under review)
19. Nadeau T., et al., 2025. Leveraging Machine Learning and Artificial Intelligence in Environmental Health Sciences. *NEJM AI*. (Under review)
20. Couraud B., et al., 2025. Frameworks for Fair Cyber-Physical Social Energy Systems and Energy Markets. *Nature, Collection on Justice and Equality in Decarbonization*. (Under review)

Peer-Reviewed Conference Papers and Book Chapters

Refereed Conference Papers (Full-length, equivalent to journal articles)

21. Cai Y., He Z., **Wu M.**, Barrett B., 2025. From Super-Resolution to Superior Land-Cover Detection: Cross-Channel Attention Network for Aerial Images. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. (Accepted)
22. He Z., Cai Y., **Wu M.**, Xian X., Barrett B., 2025. Cube Kernel: A Novel Approach to Enable Local Gradient Flow Across Channels in CNNs. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. (Accepted)
23. **Wu M.***, Huang Q., Gao S., 2025. Advancing Mixed Land Use Detection by Transforming Vision-Language Models with Spatial Intelligence. *ISPRS Annals of the Photogrammetry, Remote Sensing and Spatial Information Sciences*. DOI: 10.5194/isprs-annals-X-4-W7-2025-121-2025
24. Han T., Chen H., Wang C., Ren Y., **Wu M.***, 2025. Towards A New Era of Geo-Foundation Models: Expert-Guided Multimodal Alignment and Geospatial Context Awareness. In *Proceedings of ACM SIGSPATIAL 2025* (acceptance rate 25%), Nov 3-6, Minneapolis, MN, USA. DOI: 10.1145/3748636.3762756
25. Chen H.[#], Han T.[#], Chen S., Guo Z., Chen Y., **Wu M.***, 2025. Semantic4Safety: Causal Insights from Zero-shot Street View Imagery Segmentation for Urban Road Safety. In *Proceedings of the 8th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery (GeoAI '25)*, ACM SIGSPATIAL 2025, Nov 3-6, Minneapolis, MN, USA. DOI: 10.1145/3764912.3770830
26. Chen S., Han T., Fu C., Zhang C., Wang C., Su J., Cai G., **Wu M.***, 2025. Leveraging Depth and Language for Open-Vocabulary Domain-Generalized Semantic Segmentation. *NeurIPS 2025*. DOI: 10.48550/arXiv.2506.09881
27. Han T., Chen S., **Wu M.**, Zhang C., Cai G., 2025. Stronger, Steadier & Superior: Geometric Consistency in Depth VFM Forges Domain Generalized Semantic Segmentation. *ICCV 2025*. DOI: 10.48550/arXiv.2504.12753
28. Chen S., Han T., Zhang C., Luo X., Cai G., **Wu M.**, Su J., 2025. LiDAR-DHMT: LiDAR-Adaptive Dual Hierarchical Mask Transformer for Robust Freespace Detection. *IEEE/CVF Winter Conference on Applications of Computer Vision 2026 (WACV 2026)*; acceptance rate 6.4%).
29. Li, F., **Wu M.***, & Basiri, A., 2025. Mobility vs. Contiguity: Spatially Explicit Graph Neural Networks for COVID-19 Forecasting. *The 6th Spatial Data Science Symposium (SDSS 2025)*. DOI: <https://doi.org/10.5281/zenodo.17660772>
30. Huang X., Han T., Lin C., Li Y., **Wu M.**, Chen Y., 2025. Large-Scale Pseudo-Label Supervised 3D Segmentor with Image Priors. *IGARSS 2025 - 2025 IEEE International Geoscience and Remote Sensing Symposium*, Brisbane, Australia, 2025, pp. 1654-1658. DOI: 10.1109/IGARSS55030.2025.11243379.
31. **Wu M.**, Huang Q., Gao S., 2023. Measuring access inequality in a hybrid physical-virtual world: A case study of racial disparity of healthcare access during CoVID-19. In *Proceedings of 2023 30th International Conference on Geoinformatics*, Jul 19-21, London, UK, pg.1-10. DOI: 10.1109/Geoinformatics60313.2023.10247690

32. **Wu M.**, Huang Q., 2022. IM2City: Image geo-localization via multi-modal learning. In *Proceedings of the 5th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery (GeoAI '22)*, ACM SIGSPATIAL 2022, Nov 1-4, Seattle, WA, USA, pg.1-10. DOI: 10.1145/3557918.3565868

33. Liu X., Huang Q., Li Z., **Wu M.**, 2017. The impact of MTUP: Explore online trajectories for human mobility studies. In *Proceedings of the 1st Workshop on Prediction of Human Mobility*, ACM SIGSPATIAL 2017, Nov 7-10, Redondo Beach, CA, USA, pg.1-9. DOI:10.1145/3152341.3152348

Refereed Conference Papers (Short paper, 6 pages)

34. Liu X., Peng B., **Wu M.**, Wang M., Cai H., Huang Q., 2024. Occupation Prediction with Multimodal Learning from Tweet Messages and Google Street View Images. In *Proceedings of the 27th AGILE Conference on Geographic Information Science*, Jun 4-7 2024, Glasgow, UK, AGILE GIScience Series 5:1-6. DOI: 10.5194/agile-giss-5-36-2024

35. Wu M.D., Huang Q., Sui T., **Wu M.**, 2023. Pixel-wise Wildfire Burn Severity Classification with Bi-temporal Sentinel-2 Data and Deep Learning. In *Proceedings of the 6th International Conference on Big Data Technologies (ICBDT 2023) Conference*, Sep 22-24, 2023, Qingdao, China, pg.1-6. DOI: 10.1145/3627377.3627433

Refereed Book Chapters

36. **Wu M.**, Huang Q., Basiri A., Bicakci Y., Shingleton J., 2025. Towards GeoAI Foundation Models: A Multimodal Learning Framework with Spatial Knowledge. In Janowicz, K. et al. editors. *Geography according to ChatGPT. Frontiers in artificial intelligence and applications*. IOS Press; forthcoming. (Accepted)

37. **Wu M.**, Huang Q., 2025. From Human Mobility to Social Segregation: What Insights Can Social Media Data Provide? *Urban Human Mobility: Practices, Analytics, and Strategies for Smart Cities*. CRC Press Taylor & Francis. DOI: 10.1201/9781003503262-26

38. Huang Q., **Wu M.**, 2023. Database Fundamentals. In Xia J., Huang Q., Tu W., and Gui Z., eds. *Open GIS*. Springer Nature. ISBN-10: 303141747X. ISBN-13: 978-3031417474

39. Huang Q., **Wu M.**, 2023. Relational Databases. In Xia J., Huang Q., Tu W., and Gui Z., eds. *Open GIS*. Springer Nature. ISBN-10: 303141747X. ISBN-13: 978-3031417474

CONFERENCE AND INVITED LECTURES

1. **Wu M.**, 2025. "Enhancing AI's Geospatial Intelligence: Multimodality, Spatial-Explicitness, and Explainability," Department of Geography, University of Wisconsin-Madison, USA. (Nov 7, 2025, Invited)
2. **Wu M.**, 2025. "Enhancing AI's Geospatial Intelligence: Multimodality, Spatial-Explicitness, and Explainability," School of Geography, University of Leeds, UK. (Oct 23, 2025, Invited)
3. **Wu M.**, 2025. "Embedding Geospatial Reasoning into Foundation Models for Urban Analytics," Department of Geomatics, National Cheng Kung University, Taiwan. (Sep 26, 2025, Invited)
4. **Wu M.**, 2025. "Towards a New Era of GeoAI: Embedding Geospatial Reasoning into Foundation Models for Urban Analytics," Center for GIS, Research Center for Humanities and Social Sciences, Academia Sinica, Taiwan. (Sep 24, 2025, Invited)

5. **Wu M.**, 2025. "Advancing Mixed Land Use Detection by Embedding Spatial Intelligence into Vision-Language Models," 20th 3D GeoInfo & 9th Smart Data Smart Cities 2025, University of Tokyo, Kashiwa, Japan. (September 2-5, 2025)
6. **Wu M.**, 2025. "Embedding Geospatial Reasoning into Foundation Models for Urban Analytics," Urban Big Data Centre, University of Glasgow. (Aug 7, 2025, Invited)
7. **Wu M.**, 2025. "Towards Geo-Foundation Models for Urban Analytics," 2025 GeoAI Advancements & Applications Workshop, Hong Kong Polytechnic University. (Jul 14-15, 2025, Invited)
8. **Wu M.**, 2025. "AI Meets Geography: Embedding Spatial Intelligence into Vision-Language Models," Sun Yat-sen University. (Jul 8, 2025, Invited)
9. **Wu M.**, 2025. "Towards Geo-Foundation Models for Urban Analytics," School of Geography, University College Dublin, Ireland. (Jun 12-13, 2025, Invited)
10. **Wu M.**, 2025. "Towards Geo-Foundation Models for Urban Analytics," Machine Learning in Science (MLiS) Colloquium, University of Glasgow. (Jun 5, 2025, Invited)
11. **Wu M.**, 2025. "Generative AI and GeoVisualization," Chair of Cartography and Visual Analytics, Technical University Munich, Germany (online). (May 22, 2025, Invited)
12. **Wu M.**, 2025. "Advancing Vision-Language Models with Spatial-Context Prompt Tuning: A Case Study in GeoAI-Empowered Image Geo-Localization," 19th International Conference on Location Based Services (LBS 2025), Espoo, Finland. (May 7-9, 2025)
13. **Wu M.**, 2025. "Towards GeoAI Multimodal Foundation Models: Unlocking Spatial Knowledge through Vision-Language Models," 33rd Annual GIS Research UK Conference (GISRUK 2025), Bristol, UK. (April 22-25, 2025)
14. **Wu M.**, 2025. "Embedding Spatial Intelligence into Vision-Language Models for Urban Analytics," Sun Yat-sen University. (Feb 28, 2025, Invited)
15. **Wu M.**, 2025. "AI Meets Geography: Embedding Spatial Intelligence into Vision-Language Models," Hong Kong Polytechnic University. (Feb 24, 2025, Invited)
16. **Wu M.**, 2025. "Bridging AI and Geography: Transforming Vision-Language Models through Spatial Intelligence," University of Hong Kong. (Feb 19, 2025, Invited)
17. **Wu M.**, 2025. "Towards GeoAI Foundation Models: Unlocking Spatial Knowledge through Vision-Language Models," National University of Singapore. (Feb 14, 2025, Invited)
18. **Wu M.**, 2025. "Towards GeoAI Foundation Models: Advancing Vision-Language Models with Spatial Intelligence," Hong Kong University of Science and Technology - Guangzhou. (Feb 12, 2025, Invited)
19. **Wu M.**, 2025. "Geospatial AI for Urban Analytics: Unlocking Spatial Knowledge through Vision-Language Models," College of Science & Engineering Research Zoomposium, University of Glasgow. (Jan 15, 2025)
20. **Wu M.**, 2024. "Towards GeoAI Foundation Models: Unlocking Spatial Knowledge through Multimodal Learning," Invited Talk at School of Mathematics and Statistics, University of Glasgow (Nov 1, 2024, [Invited](#))
21. **Wu M.**, 2024. "GeoEthics" at the GeoAI Specialist Meeting, Vienna, Austria (Oct 25-27, 2024, Invited)

22. **Wu M.**, 2024. Early Career Session panelist at Spatial Data Science Symposium (SDSS), Vienna, Austria (Oct 24, 2024, Invited)
23. **Wu M.**, 2024. "Geo-Foundation Models," Invited Talk at the University of Texas at Austin Department of Geography and the Environment (Oct 24, 2024, Invited)
24. **Wu M.**, 2024. "Generative AI for Geospatial Science," Generative AI Workshop, University of Glasgow (Sep 16, 2024, Invited)
25. **Wu M.**, 2024. "Apply for a Job in Academia," GISalon hosted by GISphere & CPGIS (online). (Aug 18, 2024, Invited)
26. **Wu M.**, 2024. "Towards GeoAI Multimodal Foundation Models for Urban Analytics," 2024 AGILE Workshop on Humans in the City: Artificial Intelligence Research and Urban Environments, Glasgow, UK. (Jun 4, 2024, Invited)
27. **Wu M.**, 2024. "Spatial Context-Aware Prompt Engineering for Vision-Language Multimodal Learning," 2024 AAG GeoAI and Deep Learning Symposium: Spatially Explicit Machine Learning and Artificial Intelligence, Honolulu, Hawaii, USA. (Apr 16, 2024, Invited)
28. **Wu M.**, 2023. "Measuring access inequality in a hybrid physical-virtual world: A case study of racial disparity of healthcare access during CoVID-19," Salad Seminar, Department of Psychology, UW-Madison. (Sep 27, 2023, Invited)
29. Huang Q., Liu X., **Wu M.**, 2023. "Trajectory Data Enrichment, Learning and Application. Geography Seminar," Huadong Normal University. (Aug 9, 2023, Invited)
30. Huang Q., Tang S., **Wu M.**, 2023. "Empowering Urban Wildfire Burnt Area Detection with U-Net and Sentinel-2 Imagery." 2023 Spatial Data Science Symposium. (Online, Sep 5–6, 2023, Invited)
31. **Wu M.**, 2023. "From human mobility to social segregation: what insights can geospatial data provide?" Esri GeoScene and GISphere Public Talk (Online, Sep 18, 2023, Invited)
32. **Wu M.**, Huang Q., Gao S., 2023. "Measuring Racial Disparity in Healthcare Access During CoVID-19 in Hybrid Physical-Virtual World," 30th International Conference of Geoinformatics 2023, University College London, London, UK. (Jul 19-21, 2023)
33. **Wu M.**, Huang Q., Gao S., 2023. "A Unified Framework for Measuring Access Inequality in Hybrid Physical-Virtual World," UCGIS Symposium 2023, Yale University, New Haven, CT, USA. (Jun 6-9, 2023)
34. **Wu M.**, Huang Q., Gao S., 2023. "Vision-Language Multimodal Learning for Mixed Land Use Mapping with Street View Images," 2023 AAG Robert Raskin Student Paper Competition, Denver, CO, USA. (Mar 23-27, 2023)
35. **Wu M.**, Huang Q., 2023. "Estimating experienced racial-ethnic segregation based on social media data: A case study in Los Angeles-Long Beach-Anaheim," 2023 AAG Geographic Information Science and Systems (GISS) Specialty Group Student Competition, Denver, CO, USA. (Mar 23-27, 2023)
36. **Wu M.**, 2023. "From human mobility to social segregation: what insights can geospatial data provide?" GIS Professional Programs Coffee Talk, Department of Geography, University of Wisconsin-Madison. (Mar 22, 2023, Invited)

37. **Wu M.**, 2023. "Gap Year for a GISer – Why & How," GISalon hosted by GISphere & CPGIS (online). (Mar 5, 2023, Invited)

38. Huang Q., Vongkusolkit J., Peng B., **Wu M.**, 2023. "Weakly Supervised Learning For Near Real-Time Flood Mapping," 2023 AAG Annual Meeting, Denver, CO. (Mar 23-27, 2023)

39. Huang Q., Liu X., **Wu M.**, 2022. "Graph Neural Networks for Individual Travel Activity Inference," Digital Twins and GeoAI Symposium, Beijing, China. (Dec 20, 2022, Invited)

40. **Wu M.**, Huang Q., Gao S., 2022. "Mixed Land Use Detection via Multi-modal Learning," American Geophysical Union (AGU) Fall Meeting, Chicago, IL, USA. (Dec 12, 2022)

41. Huang Q., Peng B., **Wu M.**, Vongkusolkit J., Liu X., Scheele C., 2022. "Big data and GeoAI for natural hazard," American Geophysical Union (AGU) Fall Meeting, Chicago, IL, USA. (Dec 12-16, 2022, Invited)

42. **Wu, M.**, Huang, Q., 2022. "IM2City: Image Geo-localization via Multi-modal Learning," In the 5th ACM SIGSPATIAL International Workshop on AI for Geographic Knowledge Discovery (GeoAI '22), Seattle, WA, USA. (Nov 1, 2022)

43. **Wu, M.**, Qin, Y., Huang, Q., 2022. "People-based Segregation Indices: Measuring Segregation with Individual's Activity Space and Demographics in U.S. 50 Largest Cities Using Social Media," 2022 AAG John Odland Spatial Analysis & Modeling Student Paper Competition. (Online, Feb 26, 2022)

44. **Wu, M.**, 2021. "People-based Segregation Indices: Measuring Segregation with Individual's Activity Space and Demographics in U.S. 50 Largest Cities Using Social Media," 2021 International Graduate Workshop on GeoInformatics. (Online, Dec 18-19, 2021)

45. **Wu, M.**, 2021. "Measuring segregation from human-based perspective: a data-driven revolution of segregation measurement," Spatial Data Science Symposium 2021. (Online, Dec 13–14, 2021, Invited)

46. **Wu, M.**, 2021. "Human movement patterns of different racial-ethnic and economic groups in U.S. top 50 cities: What can social media tell us about segregation?" 28th International Conference on GeoInformatics. (Online, Nov 2-5, 2021)

PROFESSIONAL AND COMMUNITY SERVICES

External professional services

Executive Committee Member

- GIScience Research Group (GIScRG), RGS-IBG (2025-present)

Conference Program Committee

- The 1st International Conference on Geospatial Artificial Intelligence (GeoAI 2026)

Conference Session Chair/Organiser

- The 6th Spatial Data Science Symposium (SDSS 2025) - Trustworthy (Geo)AI for Population Health ([Link](#))
- The 20th 3D GeoInfo & 9th Smart Data Smart Cities 2025 ([Link](#))
- The 2025 GeoAI Advancements & Applications Workshop – Technical Session ([Link](#))
- LBS 2025 - GeoAI & LBS ([Link](#))
- GISRUK 2025 - GeoAI & Large Language Models ([Link](#))

- 2023 AAG Annual Meeting
 - Symposium on Harnessing the Geospatial Data Revolution for Sustainability Solutions: Multimodal Learning with Geospatial Big Data ([Link](#))
 - Symposium on Human Dynamics Research: Exploring Social Inequality and Segregation with Geospatial Big Data ([Link](#))
- GISphere GISalon International 2023
 - Topic: *Apply GIS/Cartography/Environment Graduate Programs*, Jun 16, 2023 ([Link](#))
 - Topic: *Apply a Job with GIS/Cartography Major*, Sep 14, 2023 ([Link](#))
- IEEE International Geoscience and Remote Sensing Symposium (IGARSS), 2021

Presentation Judge

- Outstanding Student Presentation Awards (OSPA) program, AGU Fall Meeting, 2022

Student Director

- AAG Cyber-Infrastructure Specialty Group (CISG), 2023-2024

Manuscript Reviewer

- Computers, Environment and Urban Systems, 2023-present
- International Journal of Geographical Information Science (IJGIS), 2023-present
- International Journal of Applied Earth Observation and Geoinformation, 2021-present
- IEEE IGARSS Conference, 2020-present
- Land Use Policy, 2025-present
- Scientific Reports, 2022-present
- Transactions in GIS, 2021-present

Internal professional services

MSc Program Convenor (2024-present)

- **New MSc in Geospatial Data Science & AI**, designing program documentation and new courses (e.g., Introduction to Geospatial AI and Big Geo-Data Analysis).

Viva Convenor

- Freya Margaret Ella Muir (July 2025): “Real-time Monitoring and Modelling of Coastal Change”

Graduate Representatives to Faculty/Staff Meetings

- Department of Geography, UW-Madison, 2022-2024

Student Lead of Graduates Social Committee

- Department of Geography, UW-Madison, 2017-2019

MEMBERSHIP AND OUTREACH

2017 - Present: Member, American Association of Geographers (AAG)

2021 - Present: Member, The International Association of Chinese Professionals in Geographic Information Sciences (CPGIS)

2021 - Present: Member, University Consortium for Geographic Information Science (UCGIS)

2022 - Present: Member, American Geophysical Union (AGU)

2022 - Present: Member, Association for Computing Machinery (ACM)

2024 - Present: Member, Association of Geographic Information Laboratories in Europe (AGILE)

2025 - Present: Fellow, Royal Geographical Society with IBG (RGS-IBG)