THE UNIVERSITY OF BRITISH COLUMBIA

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Education

2019. 11 – 2023. 12	Ph.D., **Survey and Mapping**, Politecnico di Milano. (With Prof. Marco Scaioni).
2016. 09 – 2019. 06	M.Sc., **Cartography and Geographic Information System**. Key Laboratory of Virtual Geographic Environment, Nanjing Normal University.
2012. 09 – 2016. 06	B.Sc., **Geographic Information System**. School of Geography, Yunnan Normal University.

Professional Experiences

2024. 06 –	**Postdoctoral Research Fellow**, The University of British Columbia, CA.
2023. 12 – 2024. 05	**Research Fellow**. Politecnico di Milano, Politecnico di Milano Mantua Campus, Unesco Research Lab.
2019. 11 – 2023. 12	**Ph.D. Researcher,** Politecnico di Milano.
2016. 09 – 2019. 06	**Research Assistant,** Nanjing Normal University.
2014. 10 – 2015. 07	**Research Assistant,** Yunnan Normal University.

Professional Society Services and Memberships

2025. 08 – **Conference Session Chair,** Silvillaser 2025

2024 – **Member,** Women+ in GEO

2022 – **Member,** ASITA (Italian Federation of Scientific Associations for Territorial and Environmental Information)

2020 – **Peer Reviewer** of 20+ manuscripts for 6+ journals and conferences in the field of Geoinformation, Photogrammetry and Remote Sensing

Teaching Experiences

2026	Workshop of Deep learning for Forest Inventories
2025	Guest Lecture of The University of Manitoba
2025	Trainer of High-performance Computing and Deep Learning in Remote Sensing
2024	Guest Lecture of Politecnico di Milano
2023	Invited Keynote Speaker in CIB's Lecture Series on AI in Construction
2020	TA of Geomatics at Politenico di Milano

Feb. 2026

Research Grants

2024	PI	Advancing Equity in Forestry: Digital Research Infrastructure and Deep Learning for All. Digital Research Alliance of Canada. **35,000 CAD**
2017	Co-PI	Graduate innovative research fund at university level: Data modeling and data organization approaches for geographic scenes based on geographic cognition. Nanjing Normal University. **20,000 RMB**
2014	PI	Undergraduate innovative research fund at university level: Assessment of suitability of urban construction land of urban uphill project in Yunnan province. Nanjing Normal University. **3,000 RMB**

Awards

2024	Graduation with Honours (Politecnico di Milano)
2019	Outstanding Graduate Award (Nanjing Normal University)
2016	Undergraduate National Outstanding Youth Award (Yunnan Normal University)
2012 - 2019	Six Scholarships for Undergraduate and Graduate Students from National Scholarship Council

Publications

- **Journal Articles (J)**

[J10] Cao, Y., Coops, N.C., Murray, B.A., Sinclair, I., Geordie Robere-McGugan, 2026. M3FNet: Multimodal multi-temporal multi-scale data fusion network for tree species composition mapping. ISPRS Journal of Photogrammetry and Remote Sensing, 231, 797-814.

[J9] Cao, Y., Coops, N.C., Murray, B.A., Sinclair, I., 2025. Enhancing tree species composition mapping using Sentinel-2 and multi-seasonal deep learning fusion. International Journal of Remote Sensing, 1–27.

[J8] Cao, Y., Scaioni, M., 2021. 3DLEB-Net: Label-Efficient Deep Learning-Based Semantic Segmentation of Building Point Clouds at LoD3 Level. Appl. Sci., 11, 8996.

[J7] Huang, Y., Qiu, Q., Sheng, Y., Min, X., **Cao, Y.,** 2019. Exploring the Relationship between Urbanization and the Eco-Environment: A Case Study of Beijing. Sustainability. 11, 6298

[J6] Huang, Y., Yuan, M., Sheng, Y., Min, X., **Cao, Y.,** 2019. Using Geographic Ontologies and Geo-Characterization to Represent Geographic Scenarios. ISPRS Int. J. Geo-Inf. 8, 566.

[J5] Cao, Y., Huang Y., Sheng, Y., 2018. Geographic Process Modeling Based on Geographic Ontology. Open Geosciences. 10(1): 782-796.

[J4] Cao, Y., Chen, J., Huang, Z., & Huang, Y. (2018). Spatial and Temporal Evolution of Population in Yunnan Province based on ArcGIS Geostatistics. Scientific and Technological Innovation. (In Chinese)

[J3] Cao, Y., Scaioni, M., A Comprehensive Understanding of Machine Learning and Deep Learning Methods for Semantic Segmentation of 3D Architectural Cultural Heritage Point Cloud. (Under Review)

[J2] Cao, Y., Scaioni, M., A Transferability Measure and Transfer Learning Method for 3D Building Point Cloud Semantic Segmentation. (Under Review)

[J1] Zhang Z., Xu Z. **Cao, Y.,** Xu N., Wang S., Cui, S., Li Z., Qin, R., Deep learning for 3D Point Cloud Processing - from Approaches, Tasks to Its Implications on Urban and Environmental Applications (Under Review)

❖ **Conference Papers (C)**

[C14] Cao, Y., Coops, N.C., Murray, B.A., Sinclair, I., Integrating Multi-Source Remote Sensing and Adaptive Deep Learning for Canadian Boreal Forests. Silvilaser 2025.

[C13] Cao, Y., Treccani D., Adami A., The Significance of Porches in Urban Applications: A Method for Automated Modeling and Integration. 3DGeoInfo 2024. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-4/W11-2024, 9–15.

[C12] Cao, Y., Scaioni, M.: A 3d Indoor-Outdoor Benchmark Dataset for LoD3 Building Point Cloud Semantic Segmentation. 2nd GEOBENCH Workshop on Evaluation and Benchmarking of Sensors, Systems and GeoSpatial Data in Photogrammetry and Remote Sensing 2023. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-1/W3-2023, 31–37.

[C11] Previtali, M., Barazzetti, L., Roncoroni, F., **Cao, Y.,** Scaioni, M., 2023. 360° Image Orientation and Reconstruction with Camera Positions Constrained by GNSS Measurements. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci. XLVIII-1/W1-2023, 411–416.

[C10] Cao, Y., Scaioni, M., 2023. A 3D Building Indoor-Outdoor Benchmark for Semantic Segmentation. ISPRS Geospatial Week 2023. Cao, Y. and Scaioni, M.: A 3D Building Indoor-Outdoor Benchmark for Semantic Segmentation, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XLVIII-1/W2-2023, 147–153,

[C9] Cao, Y., Previtali, M., Barazzetti, L., Scaioni M., 2022. Integration of Point Clouds from 360° Videos and Deep Learning Techniques for Rapid Documentation and Classification in Historical City Centers. Geodaetische Woche 2022.

[C8] Cao, Y., Teruggi, S., Fassi, F., Scaioni, M., A Comprehensive Understanding of Machine Learning and Deep Learning Methods for 3D Architectural Cultural Heritage Point Cloud Semantic Segmentation. ASITA 2022. Geomatics for Green and Digital Transition, Communications in Computer and Information Science. Springer International Publishing, Cham, pp. 329–341.

[C7] Cao, Y., Scaioni, M., 2022. A Pre-training Method for 3D Building Point Cloud Semantic Segmentation. ISPRS Congress 2022. ISPRS Ann. Photogramm. Remote Sens. Spatial Inf. Sci. V-2–2022, 219–226.

[C6] Cao, Y., Previtali, M., Barazzetti, L., Scaioni, M., 2022. Integration of Point Clouds from 360° Videos and Deep Learning Techniques for Rapid Documentation and Classification in Historical City Centers. Image Analysis and Processing. ICIAP 2022 Workshops, Lecture Notes in Computer Science. Springer International Publishing, Cham, pp. 254–265.

[C5] Cao, Y., Scaioni, M., Label-Efficient Deep Learning-based Semantic Segmentation of Building Point Clouds at Lod3 Level. ISPRS Congress 2021. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci. XLIII-B2-2021, 449–456.

[C4] Cao, Y., Scaioni, M., Deep Learning based Point Cloud Classification Method. Innsbruck, Austria. 2021. Geodaetische Woche 2021.

[C3] Cao, Y., Scaioni, M., Understanding 3D Point Cloud Deep Neural Networks by Visualization Techniques. ISPRS Congress 2020. Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci. XLIII-B2-2020, 651–657.

[C2] Cao, Y., Huang, Y., Sheng, Y., Geographic Process Modelling base on Geographic Ontology. International Environmental Modelling and Software Conferences, 2018.

[C1] Xu, Q., **Cao, Y.,** Yang, K., Analysis of Parameter Estimation and Optimization Application of Ant Colony Algorithm in Vehicle Routing Problem. Parallel Processing of Images and Optimization Techniques; and Medical Imaging. SPIE, Xiangyang, China, p. 115.