# Guangming Wang, Ph.D.

gw462@cam.ac.uk | Google Scholar
134 Wileman Way, Cambridge, CB31AR, UK | (+44) 07551399643

## Research Profile

**Visual Learning, Localization, Mapping, SLAM, Manipulation Planning in Robotics**, closing the loop: perception → prediction → action, enabling safe and scalable autonomy in real-world engineering systems.

## Employment and Education

**University of Galway** 2026 - Present
*Assistant Professor* *Galway, Ireland*
- Director of "Physical Intelligence and Robotics Lab (PIR Lab)".
- Lead/Co-Lead/Develop Ward & Burk project, EU Projects, Research Ireland projects.

**University of Cambridge** 2023 - Present
*Research Associate* *Cambridge, UK*
Line Managers: Prof. Ioannis Brilakis (2023-2025) and Prof. Brian Sheil (2025-present)
- Contribute to and help shape technical directions across three EU Projects, BIM2TWIN, OMICRON, and AEGIR.
- Lead and coordinate research on 3D perception, SLAM, and robotic systems.
- Secure and contribute to funding proposals (EPSRC, EU, industry, etc).
- Supervise PhD and MPhil students and support research team development.
- Contribute to Lectures, Tutorials, and Lab Demonstrations for undergraduates.

**ETH Zurich** 2022 – 2023
*Visiting Research Fellow in Computer Science* *Zurich, Switzerland*
Supervisor: Prof. Marc Pollefeys (IEEE Fellow)
- Drive research directions in 3D computer vision in robotics.
- Supervise MPhil students and junior PhD students.

**Shanghai Jiao Tong University** 2018 - 2023
*PhD in Automation and Robotics* *Shanghai, China*
Supervisor: Prof. Hesheng Wang (General chair of IROS 2025)
- Write several grant proposals and contributing to NSFC Projects and Industry projects.
- Supervise the Thesis of undergraduates, MPhil students, and junior PhD students.

**Central South University** 2014 - 2018
*B.Eng. in Automation Engineering* *Changsha, China*

## Teaching Experience

- 2026-present, **Lecturer and Supervisor** on "Sustainable Offsite Construction" at the University of Cambridge.
- 2025-2026, **Guest Lecturer** on "Machine Visual Perception", University of Cambridge.
- 2024-2025, **Guest Lecturer** for "Extended Reality" at the University of Cambridge.
- 2024-2025, **Supervisor** on "Mathematical Methods" and "Structural Mechanics", University of Cambridge.
- 2024-2025, **Lab Demonstrator** for "Integrated Coursework: Buildings in Earthquakes" at University of Cambridge.
- 2023-2024, **Course Designer** of "Digital Twin Systems", at the University of Cambridge.
- 2022-2023, **Supervisor** for "3D Computer Vision", at the ETH Zurich.
- 2021-2022, **Guest Lecturer** for "3D computer vision in Robotics", at the Shanghai Jiao Tong University.

## Fellowships, Awards, Scholarships

- **Fellowships and Grants:**
  - Associate Fellow of the Higher Education Academy (AFHEA) awarded by Advance HE, UK in 2025
  - German DAAD AI and Robotics Fellow in 2022 [AInet Fellows]
  - AAAI Conference on Artificial Intelligence (AAAI) Travel Grant in 2023
  - International Conference on Robotics and Automation (ICRA) Travel Grant in 2019
  - Hezhong Automobile Co., Ltd. cooperation project, 2022-2024, 3,000,000RMB. (Co-author/Contributor)
  - Natural Science Foundation of China Research Grant, 2020-2023. 2,000,000RMB. (Co-author/Contributor)
  - NVIDIA Academic Grant. Funding 10 high-performance graphics cards. (Co-author/Contributor)
- **Awards:**
  - ICRA 2026 Conference Editorial Board Best Associate Editor Award (one of only five)
  - Best PhD Thesis Award from the Chinese Association of Automation (the only one from SJTU) [News]
  - Best PhD Thesis Award from Shanghai Jiao Tong University (the only one in the Department of Automation) [News]
  - Outstanding Graduates of Shanghai City (Top 1%)

- Shanghai Jiao Tong University "Academic Star" Nomination Award (Top 0.1%) [News]
- "Outstanding Graduate" of Central South University in 2018
- Central South University (CSU) "Outstanding Student" two times in 2014-2015 and 2016-2017

➢ **Scholarships:**
- "National Scholarships for Doctoral Students" two times in 2020-2021 (Top 1%) [News] [News]
- "National Scholarships for Doctoral Students" two times in 2021-2022 (Top 1%)
- Shanghai Jiao Tong University (SJTU) "First Scholarship" in 2019-2020
- CSU Scholarship, three times in 2014-2015, 2015-2016, and 2016-2017

## Selected Invited Talks

- Topic: "**Learning-Based Robot Perception and Localisation**"
  At: ETH Zurich, Switzerland, 2022. (Invited by Prof. Marc Pollefeys)
  Technical University of Munich (TUM), Germany, 2023. (Invited by Prof. Daniel Cremers)
- Topic: "**Learning-Based Robot Perception, Localisation, and Mapping**"
  At: University College London (UCL), UK, 2024. (Invited by Prof. Dimitrios Kanoulas)
  University of Leicester, UK, 2024. (Invited by Prof. Huiyu Zhou)
- Topic: "**Toward Real2Sim2Real Embodied Robot with Digital Twins**"
  At: Hong Kong University of Science and Technology (HKUST), 2024. (Invited by Prof. Jiadong Yu)
- Topic: "**Beyond Digital Twins: World Models for Robotics**"
  At: University of Warwick, UK, 2025. (Invited by Prof. Yu Guan)

## Academic Services

- Associate Editor for the IEEE Robotics and Automation Letters (RA-L, IF=4.6) Editorial Board
- Associate Editor for the Conference Editorial Board (CEB) of the IEEE Robotics and Automation Society for International Conference on Robotics and Automation (ICRA) 2024, 2025, 2026
- Associate Editor for the Conference Editorial Board (CEB) of the IEEE Robotics and Automation Society for International Conference on Intelligent Robots and Systems (IROS) 2024, 2025, 2026

## Co-Mentorship

**Academic:** Most undergraduates and MPhils I supervised went to Cambridge, UC Berkeley, Princeton, HKU, Columbia, UCSD, UCLA, TUM, SJTU because they published papers during studies co-supervised by me. Some of these received full scholarships for their PhD. **Industry:** Some students joined the industry because of the management skills and coding skills they developed in my team.

➢ **PhD:** 4 PhD students at the University of Cambridge, 3 incoming PhD students at the University of Cambridge, 1 PhD student at the University of Oxford, 1 visiting PhD student at the University of Cambridge from the Czech Technical University in Prague, 1 PhD student at the University of Cardiff.
➢ **MPhil:** 2 MPhil students from Cambridge, 1 MPhil student from Imperial College London, 1 MPhil student from Politecnico di Torino, Italy, 1 MPhil student from KCL.
➢ **Undergrads:** 2 undergraduates at the University of Cambridge.
➢ **Past MPhil:** 12 students, from Shanghai Jiao Tong University, ETH Zurich, and the University of Cambridge.
➢ **Past undergrads:** 25 students from Shanghai Jiao Tong University.

## Selected Publications: 62 papers, with>1900 citations. H-index = 24.

11 papers published in T-RO/ICRA (in robotics domain) and 7 in T-PAMI/CVPR (in computer vision domain).

**[1]** **G. Wang**, Q. Ying, Y. Jing, O. Wysocki, B. Sheil, "ActionReasoning: Robot Action Reasoning in 3D Space with LLM for Robotic Brick Stacking", International Conference on Robotics and Automation (ICRA), 2026, accepted. [Paper]

**[2]** L. Chen, Y. Su, J. Wang, K. Li, S. Bu, P. Han, Z. Xia, B. Hu, S. Meng, **G. Wang (corresponding author)**, "CoMA-SLAM: Collaborative Multi-Agent Gaussian SLAM With Geometric Consistency", AAAI Conference on Artificial Intelligence (AAAI), 2026, accepted. [Paper]

**[3]** S. Zhu*, **G. Wang*(co-first author)**, H. Blum, Z. Wang, G. Zhang, D. Cremers, M. Pollefeys, H. Wang, "SNI-SLAM++: Tightly-Coupled Semantic Neural Implicit SLAM," in IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), vol. 48, no. 3, pp. 3399-3416, 2026. [Paper] [Code]

**[4]** **G. Wang**, Y. Zheng, Y. Guo, Z. Liu, Y. Zhu, W. Burgard, and H. Wang, "End-to-end 2D-3D Registration between Image and LiDAR Point Cloud for Vehicle Localization", IEEE Transactions on Robotics (T-RO), vol. 41, pp. 4643-4662, 2025. [Paper][Code]

**[5]** **G. Wang**, L Pan, S Peng, S Liu, C Xu, Y Miao, W Zhan, M Tomizuka, "NeRF in Robotics: A Survey", International Journal of Robotics Research (IJRR), 2025, accepted. [Paper]

**[6]** **G. Wang**, Z. Feng, C. Jiang, and H. Wang, "Unsupervised Learning of 3D Scene Flow with 3D Odometer Assistance," IEEE Transactions on Intelligent Transportation Systems (T-ITS), vol. 26, no. 4, April 2025. [Paper] [Code]

**[7]** L. Chen, B. Hu, J. Wang, S. Bu, **G. Wang (corresponding author)**, "G2-Mapping: General Gaussian Mapping for Monocular, RGB-D, and LiDAR-Inertial-Visual Systems," IEEE Transactions on Automation Science and Engineering (T-ASE), vol. 22, pp. 12347-12357, 2025. [Paper]

**[8]** L. Chen, X. Jia, S. Bu, **G. Wang (corresponding author)**, "CODE: COllaborative Visual-UWB SLAM for Online Large-Scale Metric DEnse Mapping", IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025, accepted. [Paper]

**[9]** **G. Wang**, L. Song, Y. Shen, and H. Wang, "3D Multi-target Tracking Based on Joint Optimisation of Object Detection and Scene Flow Estimation". Robotics, 2024, 46(5): 554-561. [Paper]

**[10]** Y. Zheng, **G. Wang* (co-first author)**, J. Liu, M. Pollefeys, H. Wang, "Spherical Frustum Sparse Convolution Network for LiDAR Point Cloud Semantic Segmentation", Advances in Neural Information Processing Systems (NeurIPS) 2024, 2024, accept. [Paper]

**[11]** H. Zhang, **G. Wang* (co-first author)**, X. Wu, C. Xu, M. Ding, M. Tomizuka, W. Zhan, and H. Wang, "DSLO: Deep Sequence LiDAR Odometry Based on Inconsistent Spatio-temporal Propagation", 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024, accepted. [Paper]

**[12]** S. Zhu*, **G. Wang* (co-first author)**, H. Blum, J. Liu, L. Song, M. Pollefeys, H. Wang, "SNI-SLAM: Semantic Neural Implicit SLAM", IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2024. [Paper]

**[13]** **G. Wang**, A. Mathew, M. Wang, Y. Wen, H. Alavi, W. Chen, and I. Brilakis, "Dense 3D Neural Map Reconstruction Only Using a Low-cost LiDAR", ASCE International Conference on Computing in Civil Engineering (I3CE 2024), 2024, accepted. [Paper]

**[14]** H. Deng, Y. Miao, Z. Feng, C. Jiang, X. Wu, **G. Wang (corresponding author)**, "Pseudo-LiDAR for Visual Odometry," IEEE Transactions on Instrumentation and Measurement (T-IM), 2023. [Paper] [Code]

**[15]** C. Jiang*, **G. Wang* (co-first author)**, Y. Miao, and H. Wang, "3D Scene Flow Estimation on Pseudo-LiDAR: Bridging the Gap on Estimating Point Motion," IEEE Transactions on Industrial Informatics (T-II), vol. 19, no. 6, pp. 7346-7354, June 2023. [Paper] [Code]

**[16]** **G. Wang**, X. Wu, S. Jiang, Z. Liu, and H. Wang, "Efficient 3D Deep LiDAR Odometry," IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), vol. 45, no. 5, pp. 5749-5765, May 2023. [Paper] [Code]

**[17]** **G. Wang**, C. Peng, J. Zhang, and H. Wang, "Interactive Multi-scale Fusion of 2D and 3D Features for Multi-object Tracking," IEEE Transactions on Intelligent Transportation Systems (T-ITS), vol. 24, Oct. 2023. [Paper] [Code]

**[18]** **G. Wang**, J. Zhong, S. Zhao, W. Wu, Z. Liu, and H. Wang, "3D Hierarchical Refinement and Augmentation for Unsupervised Learning of Depth and Pose from Monocular Video," IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT), vol. 33, no. 4, pp. 1776-1786, April 2023. [Paper] [Code]

**[19]** **G. Wang**, H. Zeng, Z. Wang, Z. Liu, and H. Wang, "Motion Projection Consistency Based 3D Human Pose Estimation with Virtual Bones from Monocular Videos," IEEE Transactions on Cognitive and Developmental Systems (T-CDS), vol. 15, no. 2, pp. 784-793, June 2023. [Paper] [Code]

**[20]** **G. Wang**, M. Xin, W. Wu, Z. Liu, and H. Wang, "Achieving Sample-Efficient Learning of Long-Horizon Sparse-Reward Robotic Tasks with Base Controllers," IEEE Transactions on Neural Networks and Learning Systems (T-NNLS), 2022, doi: 10.1109/TNNLS.2022.3201705. [Paper] [Code]

**[21]** **G. Wang**, C. Zhang, H. Wang, J. Wang, Y. Wang, and X. Wang, "Unsupervised Learning of Depth, Optical Flow and Pose with Occlusion From 3D Geometry," in IEEE Transactions on Intelligent Transportation Systems (T-ITS), vol. 23, no. 1, pp. 308-320, Jan. 2022. [Paper] [Code]

**[22]** **G. Wang**, S. Ren, and H. Wang, "Unsupervised Learning of Optical Flow With Non-occlusion from Geometry," IEEE Transactions on Intelligent Transportation Systems (T-ITS), vol. 23, no. 1, pp. 308-320, Jan. 2022. [Paper] [Code]

**[23]** **G. Wang**, Y. Yang, H. Zhang, Z. Liu and H. Wang, "Spherical Interpolated Convolutional Network With Distance-Feature Density for 3-D Semantic Segmentation of Point Clouds," in IEEE Transactions on Cybernetics (T-Cyb), vol. 52, no. 12, pp. 13546-13556, Dec. 2022. [Paper] [Code]

**[24]** **G. Wang**, C. Jiang, Z. Shen, Y. Miao, and H. Wang, "SFGAN: Unsupervised Generative Adversarial Learning of 3D Scene Flow from the 3D Scene Self," Advanced Intelligent Systems (AIS), vol. 4, no. 4, Dec. 2022. [Paper] [Code]

**[25]** **G. Wang**, Y. Hu, and H. Wang, "Residual 3D Scene Flow Learning with Context-Aware Feature Extraction," IEEE Transactions on Instrumentation and Measurement (T-IM), vol. 71, pp. 1-9, April 2022. [Paper] [Code]

**[26]** **G. Wang**, Y. Hu, Z. Liu, Y. Zhou, W. Zhan, M. Tomizuka, and H. Wang, "What Matters for 3D Scene Flow Network," European Conference on Computer Vision (ECCV), Oct. 23-27, 2022, pp. 38-55. [Paper] [Code]

**[27]** **G. Wang**, J. Qiu, Y. Guo, and H. Wang, "FusionNet: Coarse-to-Fine Extrinsic Calibration Network of LiDAR and Camera with Hierarchical Point-pixel Fusion," in International Conference on Robotics and Automation (ICRA), May 23-27, 2022, pp. 8964-8970. [Paper] [Code]

**[28]** **G. Wang**, X. Wu, Z. Liu, and H. Wang, "Hierarchical Attention Learning of Scene Flow in 3D Point Clouds," in IEEE Transactions on Image Processing (T-IP), vol. 30, pp. 5168-5181, May 2021. [Paper] [Code]

**[29]** **G. Wang**, H. Liu, M. Chen, Y. Yang, Z. Liu, and H. Wang, "Anchor-Based Spatio-Temporal Attention 3D Convolutional Networks for Dynamic 3D Point Cloud Sequences," in IEEE Transactions on Instrumentation and Measurement (T-IM), vol. 70, pp. 1-11, Aug. 2021. [Paper] [Code]

**[30]** **G. Wang**, X. Wu, Z. Liu, and H. Wang, "PWCLO-Net: Deep LiDAR Odometry in 3D Point Clouds Using Hierarchical Embedding Mask Optimization," IEEE Conference on Computer Vision and Pattern Recognition (CVPR), June 20-25, 2021, pp. 15905-15914. [Paper] [Code]

**[31]** **G. Wang**, X. Tian, R. Ding, and H. Wang, "Unsupervised Learning of Scene Flow from Monocular Camera," in International Conference on Robotics and Automation (ICRA), May 30-June 05, 2021, pp. 4325-4331. [Paper] [Code]

**[32]** **G. Wang**, H. Wang, Y. Liu, and W. Chen, "Unsupervised Learning of Monocular Depth and Ego-Motion Using Multiple Masks," in International Conference on Robotics and Automation (ICRA), May 20-24, 2019, pp. 4724-4730. [Paper] [Code]