FANGQIANG DING

Last update: April 21, 2026

Research Overview

My research agenda centers on **Physical AI**, which integrates advanced artificial intelligence with *physical* systems (e.g., self-driving cars, robots, wearables and IoT devices) to enable them to perceive, reason, and interact with the *physical* world. My long-term vision is a *human-machine symbiotic ecosystem* where human and embodied intelligence coexist, collaborate and co-evolve. Achieving this vision requires systems that are not only increasingly capable, but also trustworthy and scalable in the real world. **Trustworthy** systems operate *safely, reliably, and robustly* across diverse environments and tasks, while protecting human *privacy*. Scalable systems should be developed and deployed at scale in a *cost-effective* way through *affordable* sensing, computation and data pipelines. My research aims to address the real-world challenges that hinder the trustworthy and scalable Physical AI.

Research Interest

My research interests lie at robotics, computer vision, machine learning and applications.

- **Robotics:** Multimodal Perception, Manipulation, Humanoid Robot, VLA, World Model
- **Computer Vision:** Human Motion Analysis, Video Diffusion Model, Foundation Models
- **Machine Learning:** Self-/Weakly-supervised Learning, Reinforcement/Transfer Learning
- **Applications:** Autonomous Vehicles, Mobile Robotics, HRI, Healthcare, VR/AR

Academic Positions

Postdoctoral Associate 2025.10–Now

- The 77 Lab, Massachusetts Institute of Technology (MIT), Cambridge, USA
- Work with Dr. Hermano Igo Krebs

Postdoctoral Fellow 2025.4-2025.9

- The LIT-Lab, Technion - Israel Institute of Technology, Haifa, Israel
- Work with Dr. Or Litany

Education

The University of Edinburgh, Edinburgh, UK 2021.9-2025.6

- Ph.D. in Robotics and Autonomous Systems, School of Informatics
- Thesis: *Robust Spatial Perception with 4D Radar for Mobile Autonomy*
- Supervisor: Dr. Chris Xiaoxuan Lu and Prof. Barbara Webb

Tongji University, Shanghai, China 2017.9-2021.6

- B.Eng., Mechanical Engineering. GPA: **92.3/100** (ranking: **2/130**)
- Thesis: *Dynamic Regression and Joint Optimization for UAV Object Tracking*

Honors and Awards

- **RSS Pioneers 2025 (33 awardees worldwide to early-career researchers)** 2025
- UKRI EPSRC CDT-RAS PhD Scholarship 2021–2025
- Grand Prize of "Challenge Cup in Shanghai (top 1%) 2021
- Shanghai Outstanding Graduate (top 2%) 2021
- Undergraduate Academic Stars in Tongji University (10/18,510) 2020
- China National Scholarship (top 1%) 2019
- China National Scholarship (top 1%) 2018
- First Prize of Tongji Mathematics Competition (top 2%) 2018

Full List of Papers

30+ papers in top venues such as robotics, computer vision, machine learning and applications. Citations: ∼**1,500**, h-index: **17**, i10-index: **20**. * joint first author † corresponding author

Conference

- [**CVPR 2026**] Junqiao Fan, Yunjiao Zhou, Yizhuo Yang, Xinyuan Cui, Jiarui Zhang, Lihua Xie, Jianfei Yang, Chris Xiaoxuan Lu, **Fangqiang Ding**†. "M4Human: A Large-Scale Multimodal mmWave Radar Benchmark for Human Mesh Reconstruction". *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2026
  DOI: https://doi.org/10.48550/arXiv.2512.12378
- [**CVPR 2026**] Yuanzhe Liu, Jingyuan Zhu, Jin Jin, Yuchen Mo, Gen Li, Yifan Shen, Zhengyuan Li, Tianjiao Yu, Wenzhen Yuan, **Fangqiang Ding**†, Ismini Lourentzou†". "PALM: Stage-Aware Policy Composition via Affordance Reasoning for Long-Horizon Robotic Manipulation". *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2026
  DOI: https://doi.org/10.48550/arXiv.2601.07060
- [**RSS Pioneers 2025**] **Fangqiang Ding**. "Robust Spatial Perception with 4D Radar for Mobile Autonomy". *RSS Pioneers Workshop, Robotics: Science and Systems, 2025.* **(33 highly selective participants worldwide)**
  Link: https://openreview.net/pdf?id=sBqpiose0E
- [**SenSys 2025**] **Fangqiang Ding***, Yunzhou Zhu*, Xiangyu Wen, Chris Xiaoxuan Lu†. "ThermoHands: A Benchmark for 3D Hand Pose Estimation from Egocentric Thermal Images". *23rd ACM Conference on Embedded Networked Sensor Systems*, 2025. **(∼18% acceptance rate)**
  DOI: https://doi.org/10.1145/3715014.3722058
- [**ASP-DAC 2025**] Qichu Sun, Rui Meng, Haishuang Fan, **Fangqiang Ding**, Linxi Lu, Jingya Wu, Xiaowei Li, Guihai Yan. "APTO: Accelerating Serialization-Based Point Cloud Transformers with Position-Aware Pruning". *Asia and South Pacific Design Automation Conference, 2025.*
  DOI: https://doi.org/10.1145/3658617.3697655
- [**NeurIPS 2024**] **Fangqiang Ding***, Xiangyu Wen*, Yunzhou Zhu, Chris Xiaoxuan Lu†. "RadarOcc: Robust 3D Occupancy Prediction with 4D Imaging Radar". *Advances in Neural Information Processing Systems*, 2024.
  DOI: https://doi.org/10.52202/079017-3222
- [**ECCV 2024**] **Fangqiang Ding**, Zhen Luo, Peijun Zhao, Chris Xiaoxuan Lu†. "milliFlow: Scene Flow Estimation on mmWave Radar Point Cloud for Human Motion Sensing". *European Conference on Computer Vision*, 2024.
  DOI: https://doi.org/10.1007/978-3-031-72691-0_12
- [**ICRA 2024**] Zhijun Pan*, **Fangqiang Ding***, Haotao Zhong*, Chris Xiaoxuan Lu†. "RaTrack: Moving Object Detection and Tracking with 4D Radar Point Cloud". *IEEE International Conference on Robotics and Automation*, 2024.
  DOI: https://doi.org/10.1109/ICRA57147.2024.10610368
- [**CVPR 2023**] **Fangqiang Ding**, Andras Palffy, Dariu M. Gavrila, Chris Xiaoxuan Lu†. "Hidden Gems: 4D Radar Scene Flow Learning Using Cross-Modal Supervision". *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2023 (**Highlight, ∼2.6% acceptance rate**).
  DOI: https://doi.org/10.1109/CVPR52729.2023.00901
- [**ICRA 2022**] Changhong Fu†, Sihang Li, Xinnan Yuan, Junjie Ye, Ziang Cao, **Fangqiang Ding**. "Ad2Attack: Adaptive Adversarial Attack on Real-Time UAV Tracking". *IEEE International Conference on Robotics and Automation*, 2022
  DOI: https://doi.org/10.1109/ICRA46639.2022.9812056
- [**ICRA 2021**] Bowen Li, Changhong Fu† **Fangqiang Ding**, Junjie Ye, Fuling Lin. "ADTrack:

Target-Aware Dual Filter Learning for Real-Time Anti-Dark UAV Tracking". *IEEE International Conference on Robotics and Automation*, 2021.
DOI: https://doi.org/10.1109/ICRA48506.2021.9561564

- [**ICRA 2021**] Guangze Zheng, Changhong Fu†, Junjie Ye, Fuling Lin, **Fangqiang Ding**. "Mutation Sensitive Correlation Filter for Real-Time UAV Tracking with Adaptive Hybrid Label". *IEEE International Conference on Robotics and Automation*, 2021.
  DOI: https://doi.org/10.1109/ICRA48506.2021.9561931
- [**CVPR 2020**] Yiming Li, Changhong Fu†, **Fangqiang Ding**, Ziyuan Huang, Geng Lu. "AutoTrack: Towards High-Performance Visual Tracking for UAV with Automatic Spatio-Temporal Regularization", *IEEE/CVF Conference on Computer Vision and Pattern Recognition*, 2020.
  DOI: https://doi.org/10.1109/CVPR42600.2020.01194
- [**IROS 2020**] **Fangqiang Ding**, Changhong Fu†, Yiming Li, Jin Jin, Chen Feng. "Automatic Failure Recovery and Re-Initialization for Online UAV Tracking with Joint Scale and Aspect Ratio Optimization". *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2020.
  DOI: https://doi.org/10.1109/IROS45743.2020.9341744
- [**IROS 2020**] Changhong Fu†, **Fangqiang Ding**, Yiming Li, Jin Jin, Chen Feng. "DR^{2}Track: Towards Real-Time Visual Tracking for UAV via Distractor Repressed Dynamic Regression". *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2020.
  DOI: https://doi.org/10.1109/IROS45743.2020.9341761
- [**IROS 2020**] Yiming Li, Changhong Fu†, **Fangqiang Ding**, Ziyuan Huang, Jia Pan. "Augmented Memory for Correlation Filters in Real-Time UAV Tracking". *IEEE/RSJ International Conference on Intelligent Robots and Systems*, 2020
  DOI: https://doi.org/10.1109/IROS45743.2020.9341595

Journal

- [**T-ASE 2025**] Shan An, Ziyu Meng, Chao Tang, Yuning Zhou, Tengyu Liu, **Fangqiang Ding**, Shufang Zhang, Yao Mu, Ran Song†, Wei Zhang, Zeng-Guang Hou, Hong Zhang. "Dexterous Manipulation through Imitation Learning: A Survey". *IEEE Transactions on Automation Science and Engineering*, 2025.
  DOI: https://doi.org/10.1109/TASE.2025.3646183
- [**CEA 2025**] Boyuan Zhang, Fukai Zhang, Shan An†, **Fangqiang Ding**, Yu Liang, Qiang Lyu†. SCORE-DETR: An Efficient Transformer-Based Network for Small and Occluded Citrus Detection". *Computers and Electronics in Agriculture*, 2025.
  DOI: https://doi.org/10.1016/j.compag.2025.110843
- [**EAAI 2024**] Tianhang Zhang, **Fangqiang Ding**, Zilong Wang, Fu Xiao, Chris Xiaoxuan Lu, Xinyan Huang†. "Forecasting Backdraft with Multimodal Method: Fusion of Fire Image and Sensor Data". *Engineering Applications of Artificial Intelligence*, 2024.
  DOI: https://doi.org/10.1016/j.engappai.2024.107939
- [**RA-L 2022**] **Fangqiang Ding**, Zhijun Pan, Yimin Deng, Jianning Deng, Chris Xiaoxuan Lu†. "Self-Supervised Scene Flow Estimation with 4-D Automotive Radar". *IEEE Robotics and Automation Letters*, 2022.
  DOI: https://doi.org/10.1109/LRA.2022.3187248
- [**T-MC 2022**] Bowen Li, Changhong Fu†, **Fangqiang Ding**, Junjie Ye, Fuling Lin. "All-Day Object Tracking for Unmanned Aerial Vehicle". *IEEE Transactions on Mobile Computing*, 2022.
  DOI: https://doi.org/10.1109/TMC.2022.3162892
- [**T-MM 2021**] Changhong Fu†, Jin Jin, **Fangqiang Ding**, Yiming Li, Geng Lu. "Spatial Reliability Enhanced Correlation Filter: An Efficient Approach for Real-Time UAV Tracking". *IEEE*

Transactions on Multimedia, 2021.
DOI: https://doi.org/10.1109/TMM.2021.3118891

- [**T-IE 2021**] Junjie Ye, Changhong Fu†, Fuling Lin, **Fangqiang Ding**, Shan An, Geng Lu. "Multi-Regularized Correlation Filter for UAV Tracking and Self-Localization". *IEEE Transactions on Industrial Electronics*, 2021.
  DOI: https://doi.org/10.1109/TIE.2021.3088366
- [**GRSM 2021**] Changhong Fu†, Bowen Li, **Fangqiang Ding**, Fuling Lin, Geng Lu. "Correlation Filters for Unmanned Aerial Vehicle-Based Aerial Tracking: A Review and Experimental Evaluation". *IEEE Geoscience and Remote Sensing Magazine*, 2021.
  DOI: https://doi.org/10.1109/MGRS.2021.3072992
- [**EAAI 2021**] Changhong Fu†, **Fangqiang Ding**, Yiming Li, Jin Jin, Chen Feng. "Learning Dynamic Regression with Automatic Distractor Repression for Real-Time UAV Tracking". *Engineering Applications of Artificial Intelligence*, 2021.
  DOI: https://doi.org/10.1016/j.engappai.2020.104116

Under Review

- [**T-NSRE 2026**] **Fangqiang Ding**, Jiangpeng He, Javier Gervas, David Whiteman, Hermano Igo Krebs†. "AI-Based Digital Assessment of Gross Motor Function in Metachromatic Leukodystrophy". *Submitted to IEEE Transactions on Neural Systems and Rehabilitation Engineering.*
- [**T-MM 2026**] Runwei Guan, Jianan Liu, Shaofeng Liang, **Fangqiang Ding**, Shanliang Yao, Xiaokai Bai, Daizong Liu, Tao Huang, Guoqiang Mao, Hui Xiong†. "Wavelet-based Multi-View Fusion of 4D Radar Tensor and Camera for Robust 3D Object Detection". *Submitted to IEEE Transactions on Multimedia.*
  DOI: https://doi.org/10.48550/arXiv.2512.22972
- [**CoRL 2026**] Yichun Xiao, Runwei Guan, **Fangqiang Ding**†. "HyperDet: 3D Object Detection with Hyper 4D Radar Point Clouds". *Submitted to CoRL 2026.*
  DOI: https://doi.org/10.48550/arXiv.2602.11554
- [**ECCV 2026**] Chujun Tang, Lei Zhong, **Fangqiang Ding**†. "Seeking Physics in Diffusion Noise". *Submitted to ECCV 2026.*
  DOI: https://arxiv.org/pdf/2603.14294
- [**ECCV 2026**] Tomer Borreda, **Fangqiang Ding**, Sanja Fidler, Shengyu Huang, Or Litany†. "RadarGen: Automotive Radar Point Cloud Generation from Cameras". *Submitted to ECCV 2026.*
  DOI: https://doi.org/10.48550/arXiv.2512.17897
- [**NeurIPS 2026**] Qin Zhang†, Peiyu Jing, Hong-Xing Yu, **Fangqiang Ding**, Weimin Wang, Yilun Du, James Zou, Jiajun Wu, Bing Shuai. "Physion-Eval: Evaluating Physical Realism in Generated Video via Human Reasoning". *Submitted to NeurIPS 2026.*
  DOI: https://arxiv.org/pdf/2603.19607

Mentorship Experience

Current Students

- Chujun Tang, incoming MS student in Computer Science in Brown University
- Yuanzhe Liu, MS student in Data Science at University of Pennsylvania (UPenn)
- Liang Wang, UG student in Chu Kochen Honors College at Zhejiang University (ZJU)
- Yichun Xiao, MS student in Computer Science at the University of Edinburgh
- Junqiao Fan, PhD student in Nanyang Technological University (NTU)
- Tomer Borreda, MS student in Computer Science at Technion
- Liuyuan Na, MPhil in Engineering at the University of Edinburgh

Past Students

- Xiangyu Wen, now PhD student at University College London (UCL)
- Lawrence Yunzhou Zhu, now Master student at Georgia Institute of Technology
- Zhekai Duan, now PhD student at University College London (UCL)
- Xinyuan Cui, now MEng student at University of Pennsylvania (UPenn)
- Zhen Luo, now PhD student at Southern University of Science and Technology
- Hantao Zhong, now PhD student at University of Cambridge
- Zhijun Pan, now PhD student at Royal College of Art
- Nout Cleef, prev. MS student at the University of Oxford
- Guangze Zheng, now PhD student at the University of Hong Kong (HKU)
- Bowen Li, now PhD student at Carnegie Mellon University (CMU)

Academic Services

Editorial and Program Committee

- Technical Program Committee, IEEE International Conference on Sensing, Communication, and Networking (SECON) 2026
- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2025

Conference Reviewer

- International Conference on Computer Vision (ICCV)
- Robotics: Science and Systems (RSS)
- International Conference on Machine Learning (ICML)
- IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR)
- International Conference on Learning Representations (ICLR)
- Neural Information Processing Systems Datasets and Benchmarks Track (NeurIPS D&B)
- European Conference on Computer Vision (ECCV)
- Neural Information Processing Systems (NeurIPS)
- IEEE International Conference on Robotics and Automation (ICRA)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

Journal Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI)
- IEEE Transactions on Mobile Computing (T-MC)
- The International Journal of Robotics Research (IJRR)
- IEEE Transactions on Robotics (T-RO)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Industrial Informatics (T-II)
- ACM Transactions on Sensor Networks (TOSN)
- IEEE Transactions on Intelligent Vehicles (T-IV)
- IEEE Transactions on Circuits and Systems for Video Technology (T-CSVT)

References

Dr. Hermano Igo Krebs
Principal Research Scientist
Massachusetts Institute of Technology (MIT)
Email: hikrebs@mit.edu

Dr. Chris Xiaoxuan Lu
Associate Professor
University College London (UCL)
Email: xiaoxuan.lu@ucl.ac.uk

Dr. Or Litany
Assistant Professor & Senior Research Scientist
Technion & NVIDIA
Email: orlitany@gmail.com

Dr. Peijun Zhao
Vice President
JPMorganChase
Email: pjzhao95@gmail.com