

RESEARCH  
OVERVIEW

My research centers on **Physical AI**, integrating advanced artificial intelligence with *physical* systems (e.g., autonomous vehicles, robots, xR, industrial and IoT devices) to enable them to perceive, understand, and interact in 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 *robust* under changing conditions, *responsible* around humans, and *affordable* to deploy at scale. This motivates my research goals along three key axes:

- **Condition-adaptive:** robustness across illumination, weather, and environmental changes
- **Privacy-aware:** protecting user identity and sensitive content in privacy-critical applications
- **Cost-effective:** reducing expensive sensor and compute and manual data collection/labeling

RESEARCH  
INTEREST

My research interests lie at the intersections of robotics, vision, learning and real 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

**30+** papers in top venues such as robotics, computer vision, machine learning and applications.

Citations: **1,400+**, 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**<sup>†</sup>. “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**<sup>†</sup>, Ismini Lourentzou<sup>†</sup>. “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**<sup>\*</sup>, Yunzhou Zhu<sup>\*</sup>, Xiangyu Wen, Chris Xiaoxuan Lu<sup>†</sup>. “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**<sup>\*</sup>, Xiangyu Wen<sup>\*</sup>, Yunzhou Zhu, Chris Xiaoxuan Lu<sup>†</sup>. “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<sup>†</sup>. “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](https://doi.org/10.1007/978-3-031-72691-0_12)
- [ICRA 2024] Zhijun Pan<sup>\*</sup>, **Fangqiang Ding**<sup>\*</sup>, Haotao Zhong<sup>\*</sup>, Chris Xiaoxuan Lu<sup>†</sup>. “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. Gavrilă, Chris Xiaoxuan Lu<sup>†</sup>. “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<sup>†</sup>, 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<sup>†</sup> **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<sup>†</sup>, 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<sup>†</sup>, **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/CVPR42600.2020.011194>
- [IROS 2020] **Fangqiang Ding**, Changhong Fu<sup>†</sup>, 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<sup>†</sup>, **Fangqiang Ding**, Yiming Li, Jin Jin, Chen Feng. “DR<sup>2</sup>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<sup>†</sup>, **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<sup>†</sup>, 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<sup>†</sup>, **Fangqiang Ding**, Yu Liang, Qiang Lyu<sup>†</sup>. 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<sup>†</sup>. “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<sup>†</sup>. “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<sup>†</sup>, **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<sup>†</sup>, 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<sup>†</sup>, 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<sup>†</sup>, 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<sup>†</sup>, **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<sup>†</sup>. “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<sup>†</sup>. “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>
- [RA-L 2026] Yichun Xiao, Runwei Guan, **Fangqiang Ding**<sup>†</sup>. “HyperDet: 3D Object Detection with Hyper 4D Radar Point Clouds”. *Submitted to IEEE Robotics and Automation Letters*.  
DOI: <https://doi.org/10.48550/arXiv.2602.11554>
- [ECCV 2026] Chujun Tang, Lei Zhong, **Fangqiang Ding**<sup>†</sup>. “Seeking Physics in Diffusion Noise”. *Submitted to ECCV 2026*.
- [ECCV 2026] Tomer Borreda, **Fangqiang Ding**, Sanja Fidler, Shengyu Huang, Or Litany<sup>†</sup>. “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<sup>†</sup>, Peiyu Jing, Hong-Xing Yu, **Fangqiang Ding**, Weimin Wang, Yilun Du, James Zou, Jiajun Wu, Bing Shuai. “Physion-Eval: Evaluating Perceptual Physical Realism in Generative Video Through Human Reasoning”. *Submitted to NeurIPS 2026*.

MENTORSHIP  
EXPERIENCE

### Current Students

- Chujun Tang, incoming MS student in Computer Science in Brown University
- Yiran Tao: PhD student, Massachusetts Institute of Technology (MIT)
- 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)
- Jenny Baek, MEng student in Massachusetts Institute of Technology (MIT)
- 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

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Massachusetts Institute of Technology (MIT)  
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Dr. Chris Xiaoxuan Lu  
Associate Professor  
University College London (UCL)  
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Dr. Or Litany  
Assistant Professor & Senior Research Scientist  
Technion & NVIDIA  
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Dr. Peijun Zhao  
Vice President  
JPMorganChase  
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