

Chuheng Wei

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Postdoctoral Researcher, Purdue University

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RESEARCH INTERESTS

- Autonomous Driving under Non-Ideal Environmental and Sensing Conditions
- Cooperative Autonomous Systems Integrating Perception and Control
- Human-Centered and Personalized Autonomous Intelligence
- End-to-End Autonomous Driving and Vision-Language-Action (VLA) for Embodied Mobility Systems

EDUCATION

Ph.D. University of California, Riverside

Riverside, US

10/2022 – 04/2026

- Electrical and Electronics Engineering
- Advisors: Dr. Matthew Barth and Dr. Guoyuan Wu
- Dissertation Topic: *Cooperative Perception under Adverse Conditions: Addressing Challenges and Enhancing Performance*

M.Sc. University of Warwick

Coventry, UK

10/2021 – 10/2022

- Smart, Connected and Autonomous Vehicles
- Advisors: Dr. Valentina Donzella
- Dissertation: *Raw camera data object detectors: an optimisation for automotive video processing and transmission*

B.Eng. Communication University of China

Beijing, China

09/2013 – 07/2017

- Digital Media Technology
- Dissertation: *Design and Implementation of a Machine Learning-Based Vision Target Detection System for Mobile Shooting Robots*

EMPLOYMENT

Purdue University, West Lafayette, IN, US

05/2026 – Present

- Postdoctoral Research Associate

Amazon, Sunnyvale, CA, US

09/2025 – 12/2025

- Applied Scientist Intern

UC Riverside, Riverside, CA, US

01/2023 – 05/2026

- Research Assistant

Onsemi, Coventry, UK

11/2021 – 09/2022

- Computer Vision Research Assistant

Smart Walnut, Beijing, China

02/2020 – 06/2021

- C++ Teaching & Research Engineer

Bite Zhiyuan Technology Education Co., Beijing, China

07/2017 – 01/2020

- Robotics & Programming Instructor and Competition Coach

HONORS & AWARDS

Best Paper Nomination — IEEE ITSC 2025

2025

1st Place – 2025 CVPR V2X Cooperative Perception Challenge

2025

Esther F. Hays Graduate Award, UC Riverside

2025

Award – USDOT Intersection Safety Challenge (Stage 1B) Prize

2024

Best Student Poster Runner-up Award – DSAA 2024

2024

Esther F. Hays Graduate Award, UC Riverside

2024

Third Prize — RoboMasters National Finals

2017

Second Prize — North China Robot Competition

2016

Third Prize — China Robot Competition, CAA	2016
Third Prize — RoboMasters North Region	2016
Second Prize — Beijing College Student Robot Competition	2016

PUBLICATIONS

Book

V2X-Enabled Cooperative Driving Systems	Proposal Accepted
G. Wu, <u>C. Wei</u>	
Book proposal accepted by Springer Nature; full manuscript in preparation	

Journal Articles

[J7] From Roadside Detection to Collision Warning: An AI-Driven Multi-Modal Intersection Safety System	Under Review
<u>C. Wei</u> , Z. Qin, S. Li, S. P. Nayak, Z. Zhang, H. Liu, X. Zhao, P. Hao, K. Boriboonsomsin, H. Qiu, M. J. Barth, G. Wu	
Under review at Journal of Intelligent Transportation Systems (JITS)	
[J6] Foundation Models for Transportation Systems Management and Operations: A Survey of Paradigms, Tasks, and Deployment Challenges	Under Review
<u>C. Wei</u> , S. Li, Z. Wang, M. J. Barth, G. Wu	
Under review at IEEE Intelligent Transportation Systems Magazine (ITSM)	
[J5] DOV-VeRi: A Real-World Vehicle Re-identification Dataset for Cross-View Scenarios with Opposing Camera Perspectives	Under Review
<u>C. Wei</u> , Z. Qin, G. Wu, M. J. Barth, Y. Liu, E. A. Sisbot, K. Oguchi	
Under review at IEEE Transactions on Intelligent Transportation Systems (T-ITS)	
[J4] Cooperative Perception for Automated Driving: A Comprehensive Survey of Algorithms, Applications, and Future Directions	2025
<u>C. Wei</u> , G. Wu, M. J. Barth	
Proceedings of the IEEE (PIEE)	
[J3] Investigating Personalized Driving Behaviors in Dilemma Zones: Analysis and Prediction of Stop-or-Go Decisions	2025
Z. Qin, S. Li, <u>C. Wei</u> , G. Wu, M. J. Barth, A. Abdelraouf, R. Gupta, K. Han	
IEEE Robotics and Automation Letters (RA-L)	
[J2] Raw Camera Data Object Detectors: An Optimisation for Automotive Processing and Transmission	2025
<u>C. Wei</u> , P. H. Chan, A. Huggett, V. Donzella	
IEEE Access	
[J1] Vulnerable Road User Detection for Roadside-Assisted Safety Protection: A Comprehensive Survey	2025
Z. Zhang, <u>C. Wei</u> , G. Wu, M. J. Barth	
Applied Sciences	

Conference Papers

[C20] PDB: Not All Drivers Are the Same – A Personalized Dataset for Understanding Driving Behavior	Under Review
<u>C. Wei</u> , Z. Qin, S. Li, Z. Zhang, X. Zhao, G. Wu, M. J. Barth, A. Abdelraouf, R. Gupta, K. Han	
Arxiv	
[C20] ViLi-Speed: A Real-Time Lightweight Computer Vision Approach for Virtual Line-Based Speed Estimation	Accepted
<u>C. Wei</u> , Z. Qin, K. Boriboonsomsin, G. Wu	
9th International Conference on Modern Computing, Networking and Applications (IEEE MCNA 2006)	
[C18] Precision Camera Calibration for AI-Powered Traffic Surveillance at Urban Intersections	Accepted
<u>C. Wei</u> , Z. Zhao, M. Han, K. Boriboonsomsin, G. Wu	
7th International Conference on Artificial Intelligence, Robotics, and Control (IEEE AIRC 2006)	
[C17] Beyond Perception: A Survey and Future Directions of VLM-based Autonomous Driving Datasets	Accepted
<u>C. Wei</u> , H. Cheng, Z. Zhang, G. Wu,Z. Wang, M. J. Barth	

- [C16] **HeCoFuse: Cross-Modal Complementary V2X Cooperative Perception with Heterogeneous Sensors** 2025
C. Wei, Z. Qin, W. Zimmer, G. Wu, M. J. Barth
 IEEE 28th International Conference on Intelligent Transportation Systems (ITSC 2025)
- [C15] **PointCompress3D: A Point Cloud Compression Framework for Roadside LiDARs in Intelligent Transportation Systems** 2025
 W. Zimmer, R. Pranamulia, X. Zhou, J. Zhang, **C. Wei**, R. Greer, J. S. B. Perez, M. Liu, M. M. Trivedi, A. Knoll
 IEEE 28th International Conference on Intelligent Transportation Systems (ITSC 2025)
- [C14] **Hierarchical Multi-Modal Fusion for Roadside VRU Detection: Method Complementarity Under Sparse Label Constraints** 2025
C. Wei, Z. Zhang, H. Liu, G. Wu, M. J. Barth
 ICCV 2025, AI-City Workshop
- [C13] **EKI-GAN: Context-Aware Vehicle Trajectory Forecasting with Vehicle Factors and Environmental Information at Signalized Intersections** 2025
C. Wei, G. Wu, M. J. Barth
 ICCV 2025, AI-City Workshop
- [C12] **Contextual-Personalized Adaptive Cruise Control via Fine-Tuned Large Language Models** 2025
 Z. Qin, X. Yao, **C. Wei**, A. Ji, G. Wu, Z. Sun
 ICCV 2025, DriveX Workshop
- [C11] **Integrating Multi-Modal Sensors: A Review of Fusion Techniques for Intelligent Vehicles** 2025
C. Wei, Z. Qin, Z. Zhang, G. Wu, M. J. Barth
 IEEE Intelligent Vehicles Symposium (IV 2025)
- [C10] **RAF-RCNN: Adaptive Feature Transfer from Clear to Rainy Conditions for Improved Object Detection** 2024
C. Wei, Z. Qin, G. Wu, M. J. Barth, Z. Sun
 CICTP 2024
- [C9] **Cost-Efficient Driver Distraction Detection System: Transformer-Based Classification on Bayer Image** 2024
C. Wei, G. Wu, M. Barth
 IEEE 27th International Conference on Intelligent Transportation Systems (ITSC 2024)
- [C8] **Dilemma Zone: A Comprehensive Study of Influential Factors and Behavior Analysis** 2024
C. Wei, Z. Qin, G. Wu, M. J. Barth, A. Abdelraouf, R. Gupta, K. Han
 2024 Forum for Innovative Sustainable Transportation Systems (FISTS)
- [C7] **Feature Corrective Transfer Learning: End-to-End Solutions to Object Detection in Non-Ideal Visual Conditions** 2024
C. Wei, G. Wu, M. J. Barth
 CVPR 2024, UG2+ Workshop
- [C6] **KI-GAN: Knowledge-Informed Generative Adversarial Networks for Enhanced Multi-Vehicle Trajectory Forecasting at Signalized Intersections** 2024
C. Wei, G. Wu, M. J. Barth, A. Abdelraouf, R. Gupta, K. Han
 CVPR 2024, AI City Workshop
- [C5] **Enhanced Object Detection by Integrating Camera Parameters into Raw Image-Based Faster R-CNN** 2023
C. Wei, G. Wu, M. J. Barth, P. H. Chan, V. Donzella, A. Huggett
 IEEE 26th International Conference on Intelligent Transportation Systems (ITSC 2023)
- [C4] **Personalized Trajectory Prediction for Driving Behavior Modeling in Ramp-Merging Scenarios** 2023
 S. Li, **C. Wei**, G. Wu, et al.
 IEEE International Conference on Robotic Computing (IRC 2023)
- [C3] **Vehicle Detecting and Tracking Application Based on YOLOv5 and DeepSORT for Bayer Data** 2022
C. Wei
 2022 17th International Conference on Control, Automation, Robotics and Vision (ICARCV)
- [C2] **An Analysis of the Brake Performance of Radar-Based Adaptive Cruise Control During Ramp Merging on Simulation Software** 2022
 Z. Zhao, **C. Wei**
 2022 7th International Conference on Intelligent Computing and Signal Processing (ICSP)

