Wei-Jer Chang

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Education

University of California, Berkeley *Aug. 2021 – present*
Ph.D. in Mechanical Engineering (Advisor: Prof. Masayoshi Tomizuka)
- Major: Control; Minors: Machine Learning, Optimization (GPA: 4.0/4.0)
- NSF Graduate Research Fellow
- Taiwan UC Berkeley Fellowship

National Taiwan University (NTU) *Sept. 2016 – June 2020*
Bachelor of Science in Mechanical Engineering
- Graduated with first place honors: **1st /157** (Overall GPA: 4.2/4.3)

Research Experience

Diffusion Model and Dataset for Language-Conditioned Trajectory Simulation *ICCV 2025*
- Developed a flexible language-conditioned scene-diffusion model that directly conditions on natural language descriptions to control interactive agent behaviors in traffic scenarios
- Designed a scalable human-annotation pipeline to produce a 12.5k interactive behavior dataset from the Waymo Open Motion Dataset

Safety-Critical Closed-Loop Traffic Simulation with Controllable Adversaries *ECCV 2024*
- Developed a controllable traffic model with diffusion guidance to generate realistic, safety-critical, and closed-loop scenarios for planner evaluation
- Introduced controllable adversarial behavior in the diffusion process, allowing for fine-grained behavior adjustments like collision type and agent aggressiveness to support diverse scenario evaluation

Socially Controllable Behavior Generation for Interactive Traffic Simulation *RA-L 2023/ ICRA 2024*
- Built a socially-controllable model for courteous to selfish driving styles, enabling diverse social interaction modeling with validation on the Waymo Dataset.
- Integrated a novel differentiable measure for courtesy quantification in driving, utilizing both marginal and conditional behavior prediction models derived from real-world data

Social Behavior Design of Autonomous Vehicles *Aug. 2022 – Feb. 2023*
- Designed a multi-agent game-theoretic framework for social behavior planning in autonomous vehicles.
- Reformulated the multi-level optimization to a single optimization problem based on Karush–Kuhn–Tucker (KKT) conditions with CasADi

Analyzing and Enhancing Closed-loop Stability in Reactive Simulation *ITSC 2022*
- Addressed limitations of deep-learning reactive models that can produce unreliable behaviors such as off-road driving or mutual collisions.
- Improved closed-loop stability with a goal-conditioned VectorNet and integrated kinematic bicycle model decoder within the learning framework in the INTERACTION dataset.

Professional Experience

Research Intern, Applied Intuition **Mountain View, CA**
AI Research Group (Mentor: Yihan Hu and Wei Zhan) *Jan. 2025 – present*
- Focused Area: Traffic Simulation, Large Language Models, and Reinforcment Learning

Research Intern, NEC Laboratories America **San Jose, CA**
Media Analytics Group (Mentor: Manmohan Chandraker and Francesco Pittaluga) *May. 2023 – Dec. 2024*
- Focused Area: Traffic Simulation, Diffusion Models, and Autonomous Driving

Research Assistant, National Taiwan University **Taipei, Taiwan**
Bio-inspired robotics Laboratory (Advisor: Prof. Pei-Chun Lin) *Aug. 2020 – Jan. 2021*
- Focused Area: Robotics, Control, Dynamics, and Mechatronics

Research Intern, Industrial Technology Research Institute (ITRI) **Hsinchu, Taiwan**
Mechanical and Mechatronics Systems Laboratories *Jul. 2019 – Aug. 2019*
- Focused Area: Machine Learning and System Identification

Publications

1. **W. J. Chang**, W. Zhan, M. Tomizuka, M. Chandraker, and F. Pittaluga (2025). LANGTRAJ: Diffusion Model and Dataset for Language-Conditioned Trajectory Simulation in *Proc. IEEE Int. Conf. Comput. Vis. (ICCV)*, to appear.
2. **W. J. Chang**, F. Pittaluga, M. Tomizuka, W. Zhan, and M. Chandraker (2024). SAFE-SIM: Safety-Critical Closed-Loop Traffic Simulation with Diffusion-Controllable Adversaries. European Conference on Computer Vision (ECCV).

3. **W. J. Chang***, C. Tang*, C. Li, Y. Hu, M. Tomizuka and W. Zhan (2023). Editing Driver Character: Socially-Controllable Behavior Generation for Interactive Traffic Simulation. In IEEE Robotics and Automation Letters. vol. 8, no. 9, pp. 5432-5439.
4. **W. J. Chang**, Y. Hu, C. Li, W. Zhan and M. Tomizuka (2022). Analyzing and Enhancing Closed-loop Stability in Reactive Simulation. In *2022 IEEE 25th International Conference on Intelligent Transportation Systems (ITSC)* (pp. 3665-3672).
5. C. Liu, **W. J. Chang**, P. C. Lin (2022). Development of a 2-DOF Spherical Joint with Extended Range of Motion Achieves Continuous Rotation. Mechanism and Machine Theory, 177, 105057.
6. **W. J. Chang**, C. L. Chang, J. H. Ho, and P. C. Lin (2022). Design and implementation of a novel spherical robot with rolling and leaping capability. Mechanism and Machine Theory, 171, 104747.

Workshops

Workshop on Data-Driven Autonomous Driving Simulation (DDADS), CVPR 2024
Topic: *Safety-Critical Closed-Loop Traffic Simulation with Controllable Adversaries*
Multi-Agent Behavior: Properties, Computation, and Emergence (MABe), CVPR 2023
Topic: *Socially-Controllable Behavior Generation for Interactive Traffic Simulation*
International Automated Vehicle Validation Conference Workshop, IAVVC 2023
Topic*: Scenario and Behavior Diversity in Simulation for Autonomous Vehicle Validation*

Professional Service and Volunteering

- PhD Mentor, UC Berkeley Mechanical Engineering Graduate Student Council (2022 – present)
- Undergraduate Mentor, Berkeley Artificial Intelligence Research Group (2022 – 2024)
- Reviewer: IROS, ICRA, ITSC, IV, RA-L, IJRR, TASE, T-ITS, ICCV