Jingkang Wang – Curriculum Vitæ

CONTACT INFORMATION	440 Bathurst St, 4th Floor Toronto, ON M5T 2S6, Canada	*Tel:* +1 (437) 985-0337 *Email:* wangjk@cs.toronto.edu *Website:* `http://www.cs.toronto.edu/~wangjk/`

RESEARCH INTERESTS

Areas: computer vision, robotics, physical AI, world models, AI safety.

I am interested in 3D vision and robotics, particularly in building real-world 3D modeling and simulation systems to improve the safety of self-driving vehicles. My research aims to advance the frontier of physical AI by developing *robust*, *scalable*, and *generalizable* simulators of the 4D world from constrained and noisy sensory data. Our simulators bridge the domain gap between simulation and reality, support closed-loop testing (with hardware in the loop), and enable the generation of physically plausible counterfactuals to rigorously test and improve AI-based autonomy.

EDUCATION

University of Toronto
Department of Computer Science, Machine Learning Group — 2019 – 2025
Ph.D., Supervisor: Raquel Urtasun
Committee: Florian Shkurti, Sanja Fidler, David Fleet, Deva Ramanan
Thesis: Scaling Real-world Simulation for Safe Autonomy

Shanghai Jiao Tong University
School of Electronic Information and Electrical Engineering — 2015 – 2019
BASc, Advisors: Cewu Lu, Gongshen Liu
GPA: 3.994/4.3 (91.86/100), Rank: 1/95
Thesis: Reinforcement Learning with Perturbed Rewards
Excellent Bachelor Thesis (Top %1, A+), National Scholarships ×3

PROFESSIONAL EXPERIENCE

Waabi Innovation Inc.
Staff Researcher, Tech Lead Manager (World Models and Digital Twins) — 2025 – now
Senior Researcher — 2023 – 2025
Researcher II — 2022 – 2023
Researcher — 2021 – 2022

Uber ATG
Research Scientist — 2019 – 2021

Ant Financial
Research Intern — 2019 Summer
Advisor: Le Song

University of Illinois at Urbana-Champaign
Research Intern in Secure Learning Lab — 2018 – 2019
Advisor: Bo Li

UC Berkeley
Research Intern in BAIR — 2018 Summer
Advisor: Bo Li, Dawn Song

TEACHING

Carnegie Mellon University
- 16-820: Advanced Graduate Computer Vision — 2025 Winter
  Guest Lecturer: Perception and Simulation in Autonomous Driving

University of Illinois Urbana-Champaign
- CS 598: 3D Vision $\qquad$ 2025 Winter
  Guest Lecturer: Scaling World Simulators for Safe Physical Intelligence

University of British Columbia
- CPEN 391: Computer Engineering Design Studio II $\qquad$ 2025 Spring
  Guest Lecturer: Introduction to Autonomous Driving

University of Toronto
- CSC 490: Making Your Self-driving Car Perceive the World $\qquad$ 2021 Winter
  Guest Lecturer: Simulation in Autonomous Driving
  Teaching Assistant: 3D Object Tracking

PEER-REVIEWED
CONFERENCE
PUBLICATIONS

(*=equal contribution, underline=mentee)

2026

C1 Henry Che, **Jingkang Wang**, Yun Chen, Ze Yang, Sivabalan Manivasagam, Raquel Urtasun. Diffusion-guided Generalizable Enhancer for Urban Scene Reconstruction. In *International Conference on Robotics and Automation (ICRA)*, Vienna, Austria, 2026.

C2 Yun Chen*, Matthew Haines*, **Jingkang Wang**, Sahil Jain, Krzysztof Baron-Lis, Sivabalan Manivasagam, Ze Yang, Raquel Urtasun. SaLF: Sparse Local Fields for Real-Time Sensor Simulation. In *International Conference on Robotics and Automation (ICRA)*, Vienna, Austria, 2026.

2025

C3 **Jingkang Wang***, Henry Che*, Yun Chen*, Ze Yang, Lily Goli, Sivabalan Manivasagam, Raquel Urtasun. Flux4D: Flow-based Unsupervised 4D Reconstruction. In *Advances in Neural Information Processing Systems (NeurIPS)*, San Diego, US, 2025.

C4 Ze Yang, **Jingkang Wang**, Haowei Zhang, Sivabalan Manivasagam, Yun Chen, Raquel Urtasun. GenAssets: Generating in-the-wild 3D Assets in Latent Space. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Nashville, US, 2025.

2024

C5 Yun Chen*, **Jingkang Wang***, Ze Yang, Sivabalan Manivasagam, Raquel Urtasun. G3R: Generalizable Gradient-Guided Reconstruction. In *European Conference on Computer Vision (ECCV)*, Milan, Italy, 2024.

2023

C6 Ava Pun*, Gary Sun*, **Jingkang Wang***, Yun Chen, Ze Yang, Sivabalan Manivasagam, Wei-Chiu Ma, Raquel Urtasun. Neural Lighting Simulation for Urban Scenes. In *Advances in Neural Information Processing Systems (NeurIPS)*, New Orleans, USA, 2023.

C7 Jay Sarva, **Jingkang Wang**, James Tu, Yuwen Xiong, Sivabalan Manivasagam, Raquel Urtasun. Adv3D: Generating Safety-Critical 3D Objects through Closed-Loop Simulation. In *Conference on Robot Learning (CoRL)*, Atalanta, USA, 2023.

C8 Sivabalan Manivasagam*, Ioan Andrei Bârsan*, **Jingkang Wang**, Ze Yang, Raquel Urtasun. Towards Zero Domain Gap: A Comprehensive Study of Realistic LiDAR Simulation for Autonomy Testing. In *International Conference on Computer Vision (ICCV)*, Paris, France, 2023.

C9 Jeffrey Liu, Yun Chen*, Ze Yang*, **Jingkang Wang**, Sivabalan Manivasagam, Raquel Urtasun. Neural Scene Rasterization for Large Scene Rendering in Real Time. In *International Conference on Computer Vision (ICCV)*, Paris, France, 2023.

C10 Ze Yang*, Yun Chen*, **Jingkang Wang***, Sivabalan Manivasagam*, Wei-Chiu Ma, Anqi Joyce Yang, Raquel Urtasun. UniSim: A Neural Closed-Loop Sensor Simulator. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Vancouver, Canada, 2023. (**Highlight**)

C11 Yuwen Xiong, Wei-Chiu Ma, **Jingkang Wang**, Raquel Urtasun. Learning Compact Representations for LiDAR Completion and Generation. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Vancouver, Canada, 2023.

C12 Ze Yang, Sivabalan Manivasagam, Yun Chen, **Jingkang Wang**, Rui Hu, Raquel Urtasun. Reconstructing Objects in-the-wild for Realistic Sensor Simulation. In *IEEE International Conference on Robotics and Automation (ICRA)*, London. United Kingdom, 2023.

2022

C13 **Jingkang Wang**, Sivabalan Manivasagam, Yun Chen, Ze Yang, Ioan Andrei Bârsan, Anqi Yang, Wei-Chiu Ma, Raquel Urtasun. CADSim: Robust and Scalable in-the-wild 3D Reconstruction for Controllable Simulation. In *Conference on Robot Learning (CoRL)*, Auckland, New Zealand, 2022.

2021

C14 **Jingkang Wang**, <u>Ava Pun</u>, James Tu, Abbas Sadat, Sergio Casas, Sivabalan Manivasagam, Mengye Ren, Raquel Urtasun. AdvSim: Generating safety-critical scenarios for self-driving vehicles. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021.

C15 **Jingkang Wang***, Tianyun Zhang*, Sijia Liu, Pin-Yu Chen, Jiacen Xu, Makan Fardad, Bo Li. Adversarial Attack Generation Empowered by Min-Max Optimization. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

C16 **Jingkang Wang***, Hongyi Guo*, Zhaowei Zhu*, Yang Liu. Policy Learning Using Weak Supervision. In *Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

C17 James Tu*, Tsun-Hsuan Wang*, **Jingkang Wang**, Sivabalan Manivasagam, Mengye Ren, Raquel Urtasun. Adversarial attacks on multi-agent communication. In *International Conference on Computer Vision (ICCV)*, 2021.

C18 Sean Segal*, Nishanth Kumar*, Sergio Casas, Wenyuan Zeng, Mengye Ren, **Jingkang Wang**, Raquel Urtasun. Just label what you need: Fine-grained active selection for perception and prediction through partially labeled scenes. In *Conference on Robot Learning (CoRL)*, London, United Kingdom, 2021.

2020

C19 **Jingkang Wang**, Yang Liu, Bo Li. Reinforcement Learning with Perturbed Rewards. In *AAAI Conference on Artificial Intelligence (AAAI)*, New York, New York, USA, 2020. (**Spotlight**)

C20 Nicholas Vadivelu, Mengye Ren, James Tu, **Jingkang Wang**, Raquel Urtasun. Learning to communicate and correct pose errors. In *Conference on Robot Learning (CoRL)*, Cambridge, Massachusetts, USA, 2020.

C21 Gerald Friedland, Ruoxi Jia, **Jingkang Wang**, Bo Li, Nathan Mundhenk. On the Impact of Perceptual Compression on Deep Learning. In *International Conference on Multimedia Information Processing and Retrieval (MIPR)*, Shenzhen, Guangzhou, China, 2020.

2019 and before

C22 **Jingkang Wang***, Jianing Zhou*, Jie Zhou, Gongshen Liu. Multiple Character Embeddings for Chinese Word Segmentation. In *Annual Meeting of the Association for Computational Linguistics (ACL)*, Florence, Italy, 2019.

C23 Yiping Chen*, **Jingkang Wang***, Jonathan Li, Cewu Lu, Zhipeng Luo, Han Xue, Cheng Wang. LiDAR-Video Driving Dataset: Learning Driving Policies Effectively. In *IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*, Salt Lake City, Utah, USA, 2018.

PEER-REVIEWED	**2020**
WORKSHOP PAPERS W24	**Jingkang Wang***, Mengye Ren*, Ilija Bogunovic, Yuwen Xiong, Raquel Urtasun. Cost-efficient online hyperparameter optimization. In *ICML RealML Workshop*, Vienna, Austria, 2020.
W25	Tianshi Cao*, **Jingkang Wang***, Annie Zhang and Sivabalan Manivasagam. Zero-Shot Compositional Policy Learning via Language Grounding. In *ICLR Workshop on Beyond "Tabula Rasa" in Reinforcement Learning*, 2020.
W26	**Jingkang Wang***, Gaoyuan Zhang*, Sijia Liu. Is Robust Neurons' Activation Sufficient to Robustify CNNs against Adversarial Attacks? In *KDD Workshop on Adversarial Machine Learning*, 2020.

PATENTS P1	Jay Sarva, **Jingkang Wang**, James Tu, Yuwen Xiong, Sivabalan Manivasagam, Raquel Urtasun. Latent representation based appearance modification for adversarial testing and training. US20240411663 A1, US Patent, 2024.
P2	Ava Pun, Gary Sun, **Jingkang Wang**, Yun Chen, Ze Yang, Sivabalan Manivasagam, Wei-Chiu Ma, Raquel Urtasun. Deferred neural lighting in augmented image generation. US20240386656 A1, US Patent, 2024.
P3	Jeffrey Liu, Yun Chen, Ze Yang, **Jingkang Wang**, Sivabalan Manivasagam, Raquel Urtasun. Real time image rendering for large scenes. WO2024182905 A1, Worldwide Patent, 2024.
P4	Ze Yang, Yun Chen, **Jingkang Wang**, Sivabalan Manivasagam, Wei-Chiu Ma, Raquel Urtasun. Neural hash grid based multi-sensor simulation. WO2024098163 A1, Worldwide Patent, 2023.
P5	Yuwen Xiong, Wei-Chiu Ma, **Jingkang Wang**, Raquel Urtasun. Compact lidar representation. US20240161436 A1, US Patent, 2023.
P6	Ze Yang, Sivabalan Manivasagam, Yun Chen, **Jingkang Wang**, Raquel Urtasun. Real world object reconstruction and representation. US20230298263 A1, US Patent, 2023.
P7	Ioan Andrei Bârsan, Yun Chen, Wei-Chiu Ma, Sivabalan Manivasagam, Raquel Urtasun, **Jingkang Wang**, Ze Yang. Three Dimensional Object Reconstruction for Sensor Simulation, US20230410404 A1, US Patent, 2023.
P8	**Jingkang Wang**, Ava Alison Pun, Xuanyuan Tu, Mengye Ren, Abbas Sadat, Sergio Casas, Sivabalan Manivasagam, Raquel Urtasun. Generating Motion Scenarios for Self-Driving Vehicles, US 20220153298 A1, *US Patent*, 2022.
P9	Nicholas Baskar Vadivelu, Mengye Ren, Xuanyuan Tu, Raquel Urtasun, **Jingkang Wang**. Systems and Methods for Mitigating Vehicle Pose Error Across an Aggregated Feature Map, US 20220032970 A1, *US Patent*, 2022.
P10	Xuanyuan Tu, Raquel Urtasun, Tsu-shuan Wang, Sivabalan Manivasagam, **Jingkang Wang**, Mengye Ren. Systems and Methods for Training Machine-Learned Models with Deviating Intermediate Representations, US 20210279640 A1, *US Patent*, 2021.

AWARDS & HONORS	• NeurIPS Outstanding Reviewer
	• Baidu Fellowship Finalist (Top 20 worldwide)
	• CVPR Outstanding Reviewer
	• Excellent Bachelor Thesis (Top %1) of SJTU
	• Outstanding Undergraduate in Shanghai
	• National Scholarships in China (1%)
	• Level-A SJTU Outstanding Scholarships (1%)
	• SenseTime Scholarship ¥20,000 CNY
	• First Prize in National College Student Information Security Contest
	• Meritorious Award in Mathematical Contest of Modeling (MCM)
	• Yitu Scholarship ¥10,000 CNY
	• Second Prize in National College Student Information Security Contest

Awards & Honors (dates):
- NeurIPS Outstanding Reviewer — 2025
- Baidu Fellowship Finalist (Top 20 worldwide) — 2021
- CVPR Outstanding Reviewer — 2021
- Excellent Bachelor Thesis (Top %1) of SJTU — 2019
- Outstanding Undergraduate in Shanghai — 2019
- National Scholarships in China (1%) — 2018, 2017, 2016
- Level-A SJTU Outstanding Scholarships (1%) — 2018, 2017, 2016
- SenseTime Scholarship ¥20,000 CNY — 2018
- First Prize in National College Student Information Security Contest — 2018
- Meritorious Award in Mathematical Contest of Modeling (MCM) — 2018
- Yitu Scholarship ¥10,000 CNY — 2017
- Second Prize in National College Student Information Security Contest — 2017

	• Second Prize in The Chinese Mathematics Competition (CMC, Shanghai)	2017
	• Second Prize in National College Students Information Security Contest	2017
	• First Prize in Chinese Mathematical Olympiad (CMO, 10th in Shanxi)	2014

PROFESSIONAL
SERVICE

Co-organizer:
• Workshop on Data-Driven Autonomous Driving Simulation (DDADS)	CVPR26
• Tutorial on All You Need to Know about Self-Driving	CVPR26
• Reading groups at UofT and Waabi	2024 – 2025

Journal Reviewer:
- International Journal of Computer Vision (IJCV)
- IEEE Transactions on Image Processing (TIP)
- IEEE Transactions on Neural Networks and Learning Systems (TNNLS)
- Computer Vision and Image Understanding (CVIU)
- IEEE Transactions on Intelligent Transportation Systems (T-ITS)
- IEEE Transactions on Signal Processing (TSP)
- IEEE Robotics and Automation Letters (RA-L)

Conference Reviewer:
• Conference on Neural Information Processing Systems (NeurIPS)	2022 – 2025
• International Conference on Learning Representations (ICLR)	2024 – 2025
• Conference on Computer Vision and Pattern Recognition (CVPR)	2021 – 2025
• International Conference on Computer Vision (ICCV)	2021 – 2025
• IEEE International Conference on Robotics and Automation (ICRA)	2023 – 2025
• European Conference on Computer Vision (ECCV)	2022 – 2024
• International Conference on Machine Learning (ICML)	2024
• IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)	2024
• International Conference on Automated Machine Learning (AutoML)	2023
• International Conference on Intelligent Robots and Systems (IROS)	2023
• European Conference on Computer Vision (CoRL)	2022
• Annual Meeting of the Association for Computational Linguistics (ACL)	2021 – 2022
• Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL)	2022
• Empirical Methods in Natural Language Processing (EMNLP)	2021
• ACM SIGKDD Conference on Knowledge Discovery & Data Mining (KDD)	2020

INVITED TALKS

T1 Scaling World Simulators for Safe Physical Intelligence. Purdue University, March 2026.

T2 Scaling World Simulators for Safe Physical Intelligence. UWaterloo, Feb 2026.

T3 Scaling World Simulators for Safe Physical Intelligence. UW & Ai2, Oct 2025.

T4 Scaling World Simulators for Safe Physical Intelligence. UIUC, Oct 2025.

T5 Scaling World Simulators for Safe Physical Intelligence. MIT, Oct 2025.

T6 Scaling World Simulators for Safe Physical Intelligence. NYU, Oct 2025.

T7 Scaling World Simulators for Safe Physical Intelligence. UBC, Sep 2025.

T8 Building Safe and Scalable Physical AI Solutions. Keynote at CVPR25 DDADS workshop, Nashville, June 2025.

T9 A Brief Introduction to Self-Driving. UBC, Vancouver, Mar 2025.

T10 Scaling Real-world Simulation for Safe Autonomy. Online, Dec 2023.

T11 Data-Driven Sensor Simulation for Self-Driving Vehicles. UBC, Vancouver, Canada, June 2023.

T12 AdvSim: Generating Safety-Critical Scenario for Self Driving Vehicles. Shanghai Jiao Tong University & SenseTime, Oct 2021.

T13 Safety-Critical Scenario Genenration for Autonomy Testing. CVPR21 Tutorial: All about Self Driving, June 2021.

T14 Towards Secure and Interpretable Learning in Deep Neural Networks. Uber-ATG, Toronto, Canada, July 2019.

MENTORSHIP

Interns (Uber ATG & Waabi):
- Ava Pun: safety-critical scenario generation, neural lighting simulation and inverse rendering, now PhD at CMU (first-author ICCV25 best paper, Marr Price).
- Gary Sun: neural lighting estimation and simulation, now Researcher at Citadel.
- Jay Sarva: adversarial closed loop simulation, now visiting Researcher at Harvard.
- Rishi Menon: generalizable asset reconstruction, now Researcher at Waabi.
- Matthew Haines: scalable and efficient neural rendering, now Research Intern at Tesla.
- Jeffrey Liu: efficient neural rasterization for large scenes, now Researcher at Citadel.
- Henry Che: unsupervised 4D reconstruction, generalizable 3D enahncer, now MS at UIUC.
- Tao Tu: lighting-aware actor insertion with single-step diffusion model, now PhD at Cornell.
- Fan Yang: human reconstruction and animation for offline data generation.
- Jonathan Leung: in-the-wild human reconstruction and 2D neural fixer.
- Alicia Bremer: unified camera and lidar simulation with 3DGS using ray tracing.
- Lily Goli: 3D generative models from in-the-wild data.

FTE (Waabi):
- Rishi Menon: diffusion-based neural fixer for LiDAR simulation.
- Yasasa Abeysirigoonawardena: generalizable adaptor for LiDAR post-processing.
- Haojun Qiu: scalable 4D world generation and reconstruction.
- Alexander Gao: robust and generalizable unsupervised 4D reconstruction.

MEDIA COVERAGE
- The ultimate driving test for AI: Mixed Reality Testing pushes the boundaries of AV safety, Waabi Blog [link]. 2025/07.
- Simulator Realism: The New Safety Standard for the AV Industry, Waabi Blog [link]. 2025/03.
- Introducing UniSim, one of the core groundbreaking technologies powering Waabi World, Waabi Blog [link]. 2023/06.
- Welcome to Waabi World, the "ultimate simulator" for autonomous vehicles. The Verge [link] 2022/02.