



# WENHAO DING

 <https://github.com/GilgameshD>

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## EDUCATION

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**Carnegie Mellon University, Pittsburgh, USA**

*Aug 2019 - May 2024 (Expected)*

*Ph.D. Mechanical Engineering*

**Carnegie Mellon University, Pittsburgh, USA**

*Jan 2021 - Dec 2022*

*M.S. Machine Learning*

**Tsinghua University, Beijing, China**

*Aug 2014 - July 2018*

*B.Eng. Electronic Engineering*

## RESEARCH INTERESTS

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**Critical Scenario Generation:**

Generate critical scenarios in digital twins for data collection.

**Causal Discovery:**

Discover underlying causality for making interpretable decisions.

**Imitation / Reinforcement Learning:**

Improve generalization and robustness of autonomous agents.

## HONORS & AWARDS

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2022 - Qualcomm Innovation Fellowship Winner, North America

2022 - CMU K&L Gates Presidential Fellowship, College of Engineering nominee

2022 - NeurIPS Scholar Award

2019 - CMU Graduate Student Assembly/Provost Conference Funds

2018 - Tsinghua University Outstanding Undergraduate Thesis Award

2017 - 34th Tsinghua University Academic Challenge Cup (*Second prize*)

2016 - Fellowship of Spark Talents Program (*50 recipients in Tsinghua per year*)

## PUBLICATION

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Seeing is not Believing: Robust Reinforcement Learning against Spurious Correlation

**\*Wenhao Ding**, \*Laixi Shi, Yuejie Chi, Ding Zhao

Conference on Neural Information Processing Systems (**NeurIPS**) 2023

Bayesian Reparameterization of Reward-Conditioned Reinforcement Learning  
with Energy-based Models

**\*Wenhao Ding**, \*Tong Che, Ding Zhao, Marco Pavone

International Conference on Machine Learning (**ICML**) 2023

What Went Wrong? Closing the Sim-to-Real Gap via Differentiable Causal Discovery

Peide Huang, Xilun Zhang, Ziang Cao, Shiqi Liu, Mengdi Xu, **Wenhao Ding**, Jonathan Francis, Bingqing Chen,  
Ding Zhao

Conference on Robot Learning (**CoRL**) 2023

Learning to View: Decision Transformers for Active Object Detection

**Wenhao Ding**, Nathalie Majcherczyk, Mohit Deshpande, Xuwei Qi, Ding Zhao, Rajasimman Madhivanan,  
Arnie Sen

IEEE International Conference on Robotics and Automation (**ICRA**) 2023

Generalizing Goal-Conditioned Reinforcement Learning with Variational Causal Reasoning

**Wenhao Ding**, Haohong Lin, Bo Li, Ding Zhao

Conference on Neural Information Processing Systems (**NeurIPS**) 2022

SafeBench: A Benchmarking Platform for Safety Evaluation of Autonomous Vehicles

*\*Chejian Xu, \*Wenhao Ding, Weijie Lyu, Zuxin Liu, Shuai Wang, Yihan He, Hanjiang Hu, Ding Zhao, Bo Li*  
Conference on Neural Information Processing Systems (**NeurIPS**) 2022

CausalAF: Causal Autoregressive Flow for Goal-Directed Safety-Critical Scenes Generation

*Wenhao Ding, Haohong Lin, Bo Li, Ding Zhao*

Conference on Robot Learning (**CoRL**) 2022

A Survey on Safety-critical Scenario Generation for Autonomous Driving

– A Methodological Perspective

*Wenhao Ding, Chejian Xu, Haohong Lin, Bo Li, Ding Zhao*

IEEE Transactions on Intelligent Transportation Systems (**T-ITS**), March, 2023

Semantically Controllable Scene Generation with Guidance of Explicit Knowledge

*Wenhao Ding, Bo Li, Kim Ji Eun, Ding Zhao*

Environment Generation for Generalizable Robots (EGG) Workshop at **RSS** 2023

Knowledge and Logical Reasoning in the Era of Data-driven Learning Workshop at **ICML** 2023

Certifiable Deep Importance Sampling for Rare-Event Simulation of Black-Box Systems

*Mansur Arief, Yuanlu Bai, Wenhao Ding, Shengyi He, Zhiyuan Huang, Henry Lam, Ding Zhao*

Preprint arXiv:2111.02204

Trustworthy Reinforcement Learning Against Intrinsic Vulnerabilities: Robustness,

Safety, and Generalizability

*\*Mengdi Xu, \*Zuxin Liu, \*Peide Huang, Wenhao Ding, Zhepeng Cen, Bo Li, Ding Zhao*

Preprint arXiv:2209.08025

Multimodal Safety-Critical Scenarios Generation for Decision-Making Algorithms Evaluation

*Wenhao Ding, Baiming Chen, Bo Li, Kim Ji Eun, Ding Zhao*

IEEE Robotics and Automation Letters (**RA-L**)

Context-Aware Safe Reinforcement Learning for Non-Stationary Environments

*Baiming Chen, Zuxin Liu, Jiacheng Zhu, Mengdi Xu, Wenhao Ding, Liang Li, Ding Zhao*

IEEE International Conference on Robotics and Automation (**ICRA**) 2021

Task-Agnostic Online Reinforcement Learning with an Infinite Mixture of Gaussian Processes

*Mengdi Xu, Wenhao Ding, Jiacheng Zhu, Zuxin Liu, Baiming Chen, Ding Zhao*

Neural Information Processing Systems (**NeurIPS**) 2020

Deep Probabilistic Accelerated Evaluation: A Certifiable Rare-Event Simulation

Methodology for Black-Box Autonomy

*Mansur Arief\*, Zhiyuan Huang\*, Guru Kumar, Yuanlu Bai, Wenhao Ding, Henry Lam, Ding Zhao*

Artificial Intelligence and Statistics (**AISTATS**) 2021

Learning to Collide: An Adaptive Safety-Critical Scenarios Generating Method

*Wenhao Ding, Baiming Chen, Minjun Xu and Ding Zhao*

IEEE International Conference on Intelligent Robots and Systems (**IROS**) 2020

Adaptive Multi-scale Detection of Acoustic Events

*Wenhao Ding and Liang He*

IEEE/ACM Transactions on Audio, Speech, and Language Processing (**T-ASLP**)

CMTS: Conditional Multiple Trajectory Synthesizer for Generating Safety-critical Driving Scenarios

*Wenhao Ding, Mengdi Xu and Ding Zhao*

IEEE International Conference on Robotics and Automation (**ICRA**) 2020

A New Multi-vehicle Trajectory Generator to Simulate Vehicle-to-Vehicle Encounters

**Wenhao Ding**, Wenshuo Wang and Ding Zhao

IEEE International Conference on Robotics and Automation (**ICRA**) 2019

Prior Knowledge-based Regularization for Sound Event Localization and Detection

**Wenhao Ding\***, Jingyang Zhang\* and Liang He

Detection and Classification of Acoustic Scenes and Events (**DCASE**) Challenge 2019 Task 3

Multi-Scale Time-Frequency Attention for Acoustic Event Detection

Jingyang Zhang, **Wenhao Ding**, Jintao Kang and Liang He

**Interspeech** 2019

MTGAN: Speaker Verification through Multitasking Triplet Generative Adversarial Networks

**Wenhao Ding** and Liang He

**Interspeech** 2018

Hierarchical Reinforcement Learning Framework towards Multi-agent Navigation

**Wenhao Ding**, Shuaijun Li and Huihuan Qian

IEEE International Conference on Robotics and Biomimetics (**ROBIO**) 2018

Vehicle Pose and Shape Estimation through Multiple Monocular Vision

**Wenhao Ding**, Shuaijun Li, Guilin Zhang, Xiangyu Lei and Huihuan Qian

IEEE International Conference on Robotics and Biomimetics (**ROBIO**) 2018

## WORK EXPERIENCE

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**NVIDIA Research (Autonomous Vehicle Group), Santa Clara, CA, USA**

*June 2023 - Now*

*Research Scientist Intern*

**Amazon Lab126, Sunnyvale, CA, USA**

*May 2022 - Aug 2022*

*Applied Scientist Intern*

**Bosch Center for Artificial Intelligence, Pittsburgh, PA, USA**

*May 2021 - Aug 2021*

*Machine Learning Research Intern*

**Tsinghua University, Beijing, China**

*July 2018 - Aug 2019*

*Research Engineer*

**Chinese University of HongKong, HongKong, China**

*July 2017 - Sep 2017*

*Research Assitant*

## ACADEMIC SERVICES

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**Conference Reviewer:** ICML 22-23, ICLR 22-23, NeurIPS 21-23 (top reviewer), ECCV 22, CVPR 22-23, ICCV 21-23, ICRA 20-23, IROS 20-23, ICME 20-23

**Journal Reviewer:** TMLR, IEEE RA-L, IEEE Access, IEEE T-ITS, IEEE TII, IEEE MM

**Organizer:** CVPR 2023 Secure and Safe Autonomous Driving Workshop and Challenge  
ICRA 2022 SeasonDepth Challenge

**Program Committee:** NeurIPS 2022 ML4AD Workshop  
NeurIPS 2022 TSRML Workshop  
IJCAI 2022 AI4AD Workshop and Challenge

## STUDENTS MENTORED

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Miao Li, <i>Ph.D. student in CMU</i>	<i>Aug 2022 - Now</i>
Haohong Lin, <i>Ph.D. student in CMU</i>	<i>Aug 2021 - Now</i>
Shuai Wang, <i>Master's student in CMU</i>	<i>Aug 2021 - May 2023</i>
Guilin Zhang, <i>Master's student in CMU, now in Google</i>	<i>Aug 2021 - May 2022</i>
Yihan He, <i>Master's student in CMU, now in DeepRoute</i>	<i>Aug 2021 - May 2022</i>
Jiayi Xia, <i>Master's student in CMU, now in Zoox</i>	<i>Oct 2021 - May 2022</i>
Minjun Xu, <i>Master's student in CMU, now in Akuna Capital</i>	<i>Oct 2020 - May 2021</i>
Manoj Bhat, <i>Master's student in CMU, now in Amazon</i>	<i>Oct 2020 - May 2021</i>

## INVITED TALKS

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Critical Scenario Generation for Trustworthy Autonomy <i>ZhiDongXi MOOCs (online), more than 1000 audiences</i>	<i>June 8 2023</i>
Critical Scenario Generation for Trustworthy Autonomy <i>Department of Electronic Engineering, Tsinghua, China, host by Prof. Liang He (online)</i>	<i>Apr 12 2023</i>
Critical Scenario Generation for Trustworthy Autonomy <i>AISOC Lab, CMU, USA, host by Prof. Fei Fang</i>	<i>Mar 21 2023</i>
Generalizing Goal-Conditioned Reinforcement Learning with Variational Causal Reasoning <i>AI Timer, China (online)</i>	<i>Feb 16 2023</i>
Safety-critical Scenarios Generation with Causal Discovery <i>Wayve, UK (online)</i>	<i>Oct 26 2022</i>
Safety-Critical Driving Scenario Generation – and What Lessons We Have Learned <i>University of Pennsylvania, USA (online), host by Prof. Rahul Mangharam</i>	<i>Feb 28 2022</i>
Safety-critical Scenarios Generation for Autonomous Vehicles <i>Stanford University, USA (online), host by Prof. Mykel Kochenderfer</i>	<i>Jan 31 2022</i>