



# 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 Digital Twin:**

Generating critical scenarios in digital twin for autonomy development.

**Adversarial Machine Learning:**

Improving robustness by training against semantic adversarial examples.

**Causal Reinforcement Learning:**

Making generalizable decisions by discovering the underlying causality.

## 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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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

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

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

Semantically Controllable Scene Generation with Guidance of Explicit Knowledge

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

Preprint arXiv:2106.04066

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

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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<b>Amazon Lab126, Sunnyvale, CA, USA</b> <i>Applied Scientist Intern</i>	<i>May 2022 - Aug 2022</i>
<b>Bosch Center for Artificial Intelligence, Pittsburgh, PA, USA</b> <i>Machine Learning Research Intern</i>	<i>May 2021 - Aug 2021</i>
<b>Tsinghua University, Beijing, China</b> <i>Research Engineer</i>	<i>July 2018 - Aug 2019</i>
<b>Chinese University of HongKong, HongKong, China</b> <i>Research Assitant</i>	<i>July 2017 - Sep 2017</i>

## ACADEMIC SERVICES

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<b>Conference Reviewer:</b>	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
<b>Journal Reviewer:</b>	TMLR, IEEE RA-L, IEEE Access, IEEE T-ITS, IEEE TII, IEEE MM
<b>Organizer:</b>	CVPR 2023 Secure and Safe Autonomous Driving Workshop and Challenge ICRA 2022 SeasonDepth Challenge
<b>Program Committee:</b>	NeurIPS 2022 ML4AD Workshop NeurIPS 2022 TSRML Workshop IJCAI 2022 AI4AD Workshop and Challenge

## STUDENTS MENTORED

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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 - Now</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>