

# PEIDE HUANG

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## EDUCATION

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### Carnegie Mellon University

September 2020 - Present

*M.S. in Machine Learning*

*Ph.D. in Mechanical Engineering*

*Pittsburgh, PA, US*

Academic advisor: Prof. Ding Zhao (SafeAI Lab)

### Stanford University

September 2018 - April 2020

*M.S. in Mechanical Engineering (Robotics Track), GPA: 3.9/4.0*

*Stanford, CA, US*

### Nanyang Technological University, Singapore

September 2014 - May 2018

*B.E. in Aerospace Engineering with Highest Distinction, GPA: 4.9/5.0*

*Singapore*

## CURRENT RESEARCH

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Peide's research goal is to understand the interplay between the learning agents and the tasks, with the objective of enabling safe, robust, and efficient decision-making. To achieve this goal, he leverages curriculum learning, game theory, and foundation models. He tackles real-world applications in robotics and autonomous driving.

## SELECTED PUBLICATIONS

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\* indicates equal contribution.

### 1. Creative Robot Tool Use with Large Language Models

Mengdi Xu\*, **Peide Huang\***, Wenhao Yu\*, Shiqi Liu, Xilun Zhang, Yaru Niu, Tingnan Zhang, Fei Xia, Jie Tan, Ding Zhao.

Preprint

### 2. 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

7th Conference on Robot Learning (CoRL 2023)

### 3. Continual Vision-based Reinforcement Learning with Group Symmetries

Shiqi Liu\*, Mengdi Xu\*, **Peide Huang**, Yongkang Liu, Kentaro Oguchi, Ding Zhao

7th Conference on Robot Learning (CoRL 2023) (Oral, 6.6%)

### 4. Curriculum Reinforcement Learning using Optimal Transport via Gradual Domain Adaptation

**Peide Huang**, Mengdi Xu, Jiacheng Zhu, Laixi Shi, Fei Fang, Ding Zhao.

The 36th Conference on Neural Information Processing Systems (NeurIPS 2022)

### 5. Robust Reinforcement Learning as a Stackelberg Game via Adaptively-Regularized Adversarial Training

**Peide Huang**, Mengdi Xu, Fei Fang, Ding Zhao.

The 31st International Joint Conference on Artificial Intelligence (IJCAI 2022).

### 6. Scalable Safety-Critical Policy Evaluation with Accelerated Rare Event Sampling

Mengdi Xu, **Peide Huang**, Fengpei Li, Jiacheng Zhu, Xuewei Qi, Kentaro Oguchi, Zhiyuan Huang, Henry Lam, and Ding Zhao.

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022).

### 7. Group Distributionally Robust Reinforcement Learning with Hierarchical Latent Variables

Mengdi Xu, **Peide Huang**, Yaru Niu, Visak Kumar, Jielin Qiu, Chao Fang, Kuan-Hui Lee, Xuewei Qi, Henry Lam, Bo Li, Ding Zhao.

The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023)

8. **Cardiac Disease Diagnosis on Imbalanced Electrocardiography Data Through Optimal Transport Augmentation**  
Jielin Qiu, Jiacheng Zhu, Mengdi Xu, **Peide Huang**, Michael Rosenberg, Douglas Weber, Emerson Liu, Ding Zhao  
2023 IEEE International Conference on Acoustics, Speech, and Signal Processing (ICASSP 2023)
9. **Latent Goal Allocation for Multi-Agent Goal-Conditioned Self-Supervised Imitation Learning**  
**Peide Huang**<sup>\*</sup>, Rui Chen<sup>\*</sup>, and Laixi Shi<sup>\*</sup>.  
NeurIPS 2021 Bayesian Deep Learning Workshop.
10. **Trustworthy Reinforcement Learning Against Intrinsic Vulnerabilities: Robustness, Safety, and Generalizability**  
**Peide Huang**<sup>\*</sup>, Mengdi Xu<sup>\*</sup>, Zuxin Liu<sup>\*</sup>, Wenhao Ding, Zhepeng Cen, Bo Li, Ding Zhao.  
Preprint
11. **Multimodal Representation Learning of Cardiovascular Magnetic Resonance Imaging**  
Jielin Qiu<sup>\*</sup>, **Peide Huang**<sup>\*</sup>, Makiya Nakashima, Jaehyun Lee, Jiacheng Zhu, Wilson Tang, Pohao Chen, Christopher Nguyen, Byung-Hak Kim, Debbie Kwon, Douglas Weber, Ding Zhao, David Chen.  
Preprint

## AWARDS AND HONORS

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- CMU Machine Learning Department Fellowship 2023-2024
- NeurIPS 2022 Scholar Award
- NeurIPS 2022 Top Reviewer (8% of all reviewers)
- ICLR 2021 Travel Award
- NTU 2016 President Research Scholar with Distinction

## INTERNSHIP EXPERIENCE

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**Bosch Center for Artificial Intelligence**  
*Machine Learning Research Intern*

May 2023 - August 2023  
*Pennsylvania, US*

- Proposed a novel sim-to-real approach that aligns the robot simulator with the real world by discovering the causal relationship between the simulator parameters and the sim-to-real gap.
- Proposed a safety-critical scenario generation method for autonomous vehicle evaluation.

**Flexiv Robotics Ltd.**  
*System Engineer Intern*

June 2019 - September 2019  
*California, US*

- Established a new experimental software and hardware framework to expedite the prototyping and testing procedure of products in development. Developed a multi-threaded inter-process communication software library to achieve more robust and faster communication between middle-ware modules.
- Coordinated with senior engineers and managers to ensure smooth integration of the new framework into the R&D department. Constructed a standard operating procedure for the experimental setup.

**Agency for Science, Technology and Research, Singapore**  
*Research Assistant*

January 2017 - June 2017  
*Singapore*

- Designed and developed a variable footprint, Omni-directional mobile robotic platform that can change the morphology for increased stability or compactness in response to the task requirements.
- Communicated with the supervisor and managed the project timeline, budgeting, and deliverables.

## SERVICES

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<b>Conference Reviewer</b>	NeurIPS, ICML, ICLR, AISTATS, ICASSP, CVPR
<b>Journal Reviewer</b>	TPAMI, IJCV

## TEACHING AND LEADERSHIP EXPERIENCE

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<b>CMU Modern Control Theory, Fall 2021</b>	Head of teaching assistants
<b>CMU Linear Control Systems, Fall 2020</b>	Head of teaching assistants
<b>NTU Introduction to Computing, Spring 2016</b>	Peer tutor
<b>NTU Robotics Club</b>	Co-founder and Vice President