

# PEIDE HUANG

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## EDUCATION

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<b>Carnegie Mellon University</b> <i>Ph.D. in Mechanical Engineering (SafeAI Lab)</i> <i>M.S. in Machine Learning</i>	September 2020 - September 2024  <i>Pittsburgh, PA, US</i>
<b>Stanford University</b> <i>M.S. in Mechanical Engineering (Robotics and Control), GPA: 3.9/4.0</i>	September 2018 - April 2020 <i>Stanford, CA, US</i>
<b>Nanyang Technological University, Singapore</b> <i>B.E. in Aerospace Engineering with Highest Distinction, GPA: 4.9/5.0</i>	September 2014 - May 2018 <i>Singapore</i>

## WORK EXPERIENCE

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<b>Apple</b> <i>Machine Learning Researcher, AIML</i>	May 2024 - Now <i>California, US</i>
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- Develop foundation models for decision-making and robotics.

<b>Bosch Center for Artificial Intelligence</b> <i>Machine Learning Research Intern</i>	May 2023 - August 2023 <i>Pennsylvania, US</i>
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- 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.

<b>Flexiv Robotics Ltd.</b> <i>System Engineer Intern</i>	June 2019 - September 2019 <i>California, US</i>
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- 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.

<b>Agency for Science, Technology and Research, Singapore</b> <i>Research Assistant</i>	January 2017 - June 2017 <i>Singapore</i>
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- 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.

## SELECTED PUBLICATIONS

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\* indicates equal contribution.

1. **Gradient Shaping for Multi-Constraint Safe Reinforcement Learning**  
Yihang Yao, Zuxin Liu, Zhepeng Cen, **Peide Huang**, Tingnan Zhang, Wenhao Yu, Ding Zhao.  
6th Annual Learning for Dynamics & Control Conference (L4DC 2024)
2. **Creative Robot Tool Use with Large Language Models**  
Mengdi Xu<sup>\*</sup>, **Peide Huang**<sup>\*</sup>, Wenhao Yu<sup>\*</sup>, Shiqi Liu, Xilun Zhang, Yaru Niu, Tingnan Zhang, Fei Xia, Jie Tan, Ding Zhao.  
Preprint

3. **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)
4. **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%)
5. **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)
6. **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).
7. **Scalable Safety-Critical Policy Evaluation with Accelerated Rare Event Sampling**  
 Mengdi Xu, **Peide Huang**, Fengpei Li, Jiacheng Zhu, Xuwei Qi, Kentaro Oguchi, Zhiyuan Huang, Henry Lam, and Ding Zhao.  
 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2022).
8. **CaDRE: Controllable and Diverse Generation of Safety-Critical Driving Scenarios using Real-World Trajectories**  
**Peide Huang**, Wenhao Ding, Jonathan Francis, Bingqing Chen, Ding Zhao.  
 Preprint
9. **Group Distributionally Robust Reinforcement Learning with Hierarchical Latent Variables**  
 Mengdi Xu, **Peide Huang**, Yaru Niu, Visak Kumar, Jieliu Qiu, Chao Fang, Kuan-Hui Lee, Xuwei Qi, Henry Lam, Bo Li, Ding Zhao.  
 The 26th International Conference on Artificial Intelligence and Statistics (AISTATS 2023)
10. **Cardiac Disease Diagnosis on Imbalanced Electrocardiography Data Through Optimal Transport Augmentation**  
 Jieliu 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)
11. **Latent Goal Allocation for Multi-Agent Goal-Conditioned Self-Supervised Imitation Learning**  
**Peide Huang\***, Rui Chen\*, and Laixi Shi\*.  
 NeurIPS 2021 Bayesian Deep Learning Workshop.
12. **Trustworthy Reinforcement Learning Against Intrinsic Vulnerabilities: Robustness, Safety, and Generalizability**  
**Peide Huang\***, Mengdi Xu\*, Zuxin Liu\*, Wenhao Ding, Zhepeng Cen, Bo Li, Ding Zhao.  
 Preprint
13. **Multimodal Representation Learning of Cardiovascular Magnetic Resonance Imaging**  
 Jieliu Qiu\*, **Peide Huang\***, Makiya Nakashima, Jaehyun Lee, Jiacheng Zhu, Wilson Tang, Pohao Chen, Christopher Nguyen, Byung-Hak Kim, Debbie Kwon, Douglas Weber, Ding Zhao, David Chen.  
 Preprint

- 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

## **SERVICES**

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<b>Conference Reviewer</b>	NeurIPS, ICML, ICLR, CoRL, RLC, AISTATS, RLC, 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