

# Zhan Ling

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## EDUCATION

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**University of California San Diego**, La Jolla, California, USA 2019.9–Now  
Doctor of Philosophy, Computer Science and Engineering, Advisor: Prof. Hao Su  
Master of Science, Computer Science and Engineering

**Tsinghua University**, Beijing, China 2015.8–2019.7  
Bachelor of Engineering, Institute for Interdisciplinary Information Sciences (IIIS)  
**Yao Class** (founded by Turing Award Laureate, Prof. Andrew Chi-Chih Yao)

## RESEARCH INTEREST

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My long-term research interests lie in developing intelligent agents that can solve challenging problems and continually improve through interactions. I have extensively explored diverse areas such as imitation learning, reinforcement learning, robotics, and reasoning. Currently, my primary goal is to create an LLM/VLM-based reasoning agent capable of achieving superhuman performance on challenging problems, such as solving advanced math and coding problems.

## PUBLICATIONS AND PREPRINTS

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(\*, \*\*, \*\*, indicates equal contribution)

1. [Unleashing the Creative Mind: Language Model As Hierarchical Policy For Improved Exploration on Challenging Problem Solving](#). **Zhan Ling**, Yunhao Fang, Xuanlin Li, Tongzhou Mu, Mingu Lee, Reza Pourreza, Roland Memisevic, Hao Su. Preprint.
2. [Deductive Verification of Chain-of-Thought Reasoning](#). **Zhan Ling\***, Yunhao Fang\*, Xuanlin Li, Zhiao Huang, Mingu Lee, Roland Memisevic, Hao Su. *Neural Information Processing Systems (NeurIPS) 2023*.
3. [On the Efficacy of 3D Point Cloud Reinforcement Learning](#). **Zhan Ling\***, Yunchao Yao\*, Xuanling Li, Hao Su. Preprint.
4. [Distilling Large Vision-Language Model with Out-of-Distribution Generalizability](#). Xuanlin Li\*, Yunhao Fang\*, Minghua Liu, **Zhan Ling**, Zhuowen Tu, Hao Su. *IEEE / CVF International Conference on Computer Vision (ICCV) 2023*.
5. [Reparameterized Policy Learning for Multimodal Trajectory Optimization](#). Zhiao Huang, Litian Liang, **Zhan Ling**, Xuanlin Li, Chuang Gan, Hao Su. Deep Reinforcement Learning Workshop, Neural Information Processing Systems(NeurIPS) 2022; *International Conference on Machine Learning (ICML) 2023*, **Oral**.
6. [PartSLIP: Low-Shot Part Segmentation for 3D Point Clouds via Pretrained Image-Language Models](#). Minghua Liu, Yinhao Zhu, Hong Cai, Shizhong Han, **Zhan Ling**, Fatih Porikli, Hao Su. *IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR) 2023*.

7. [ManiSkill2: A Unified Benchmark for Generalizable Manipulation Skills](#). Jiayuan Gu\*, Fanbo Xiang\*, Xuanlin Li\*\*, **Zhan Ling\*\***, Xiqiang Liu\*\*, Tongzhou Mu\*\*, Yihe Tang\*\*, Stone Tao\*\*, Xinyue Wei\*\*, Yunchao Yao\*\*, Xiaodi Yuan, Pengwei Xie, Zhiao Huang, Rui Chen, Hao Su. *International Conference on Learning Representations (ICLR) 2023*.
8. [Frame Mining: a Free Lunch for Learning Robotic Manipulation from 3D Point Clouds](#). Minghua Liu\*, Xuanlin Li\*, **Zhan Ling\***, Yangyan Li, Hao Su. *Conference on Robot Learning (CoRL) 2022*.
9. [Improving policy optimization with generalist-specialist learning](#). Zhiwei Jia, Xuanlin Li, **Zhan Ling**, Shuang Liu, Yiran Wu, Hao Su. *International Conference on Machine Learning (ICML) 2022*.
10. [Close the Visual Domain Gap by Physics-Grounded Active Stereovision Depth Sensor Simulation](#). Xiaoshuai Zhang\*, Rui Chen\*, Ang Li\*\*, Fanbo Xiang\*\*, Yuzhe Qin\*\*, Jiayuan Gu\*\*, **Zhan Ling\*\***, Minghua Liu\*\*, Peiyu Zeng\*\*, Songfang Han\*\*\*, Zhiao Huang\*\*\*, Tongzhou Mu\*\*\*, Jing Xu, Hao Su. *IEEE Transactions on Robotics (T-RO) 2023*.
11. [Approximate Convex Decomposition for 3D Meshes with Collision-Aware Concavity and Tree Search](#). Xinyue Wei\*, Minghua Liu\*, **Zhan Ling**, Hao Su. *ACM Transactions on Graphics (Proceedings of SIGGRAPH) 2022*.
12. [ManiSkill: Generalizable Manipulation Skill Benchmark with Large-Scale Demonstrations](#). Tongzhou Mu\*, **Zhan Ling\***, Fanbo Xiang\*, Derek Yang\*, Xuanlin Li\*, Stone Tao, Zhiao Huang, Zhiwei Jia, Hao Su. *Neural Information Processing Systems (NeurIPS) Datasets and Benchmarks Track 2021*.
13. [State Alignment-based Imitation Learning](#). Fangchen Liu, **Zhan Ling**, Tongzhou Mu, Hao Su. *International Conference on Learning Representations (ICLR) 2020*.

## AWARDS AND SERVICES

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**Conference Reviewer:** CVPR 2022-2024; ICCV 2021, 2023; ECCV 2022, 2024; NeurIPS 2023-2024; ICLR 2024-2025; ICML 2024; ACCV 2024.

**Journal Reviewer:** T-RO; RA-L.

**Program Committee:** AAAI 2025.

**Awards:**

Outstanding Freshman Scholarship, Tsinghua University, 2015

**First Prize (Gold Medal)** in National Olympiad in Informatics (NOI), China, 2014

**Workshop Reviewer:**

Generalizable Policy Learning in the Physical World, ICLR 2022.

Interdisciplinary Exploration of Generalizable Manipulation Policy Learning: Paradigms and Debates, RSS 2023.

**Challenge Organizer or Contributor:**

[SAPIEN ManiSkill Challenge 2021](#)

[SAPIEN ManiSkill Challenge 2022](#)

## WORK EXPERIENCES

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*ByteDance Inc.*, San Jose

2024.6-Now

Seed LLM Team

Student Researcher, Host: Jiecao Chen

### **Building a Synthetic Benchmark/Dataset for Long-Context Reasoning**

- We develop an algorithm to create a synthetic benchmark/dataset for multi-hop, long-context reasoning.

*Qualcomm AI Research*, San Diego

2023.6-2023.9

System 2 Team

Interim Engineering Intern, Host: Mingu Lee, Reza Pourreza, Roland Memisevic

### **Unleashing the Creative Mind: Language Model As Hierarchical Policy For Improved Exploration on Challenging Problem Solving**

- Existing LLMs often have limited exploration capabilities in reasoning tasks, even when combined with sampling or tree search methods.
- Our key observation is that LLMs struggle to explore the high-level tactic space effectively.
- We propose an improved exploration strategy by using LLMs as a hierarchical policy, where the high-level policy sets the direction and the low-level policy handles the detailed reasoning steps.
- Details can be found in the paper [1].

*Qualcomm AI Research*, Remote

2022.10-2023.6

System 2 Team

Support Engineering, Host: Mingu Lee, Roland Memisevic

### **Deductive Verification of Chain-of-Thought Reasoning**

- LLMs can produce unreliable reasoning chains that may contain logical errors and hallucinations.
- We propose a reasoning format called “Natural Program,” which requires LLMs to generate reasoning chains in a verifiable format.
- We then use LLMs to perform step-by-step self-verification to filter out invalid reasoning chains and improve the reliability of the reasoning chains.
- Details can be found in the paper [2].

*Qualcomm AI Research*, Remote

2022.6-2022.9

System 2 Team

Interim Engineering Intern, Host: Mingu Lee, Roland Memisevic

### **Learning Code Execution with Language Model**

- The goal is to determine whether LLMs can execute code as a Turing machine.
- We develop a random code generator that supports loops, conditionals, and function calls.
- We modify the interpreter to collect execution traces of the generated codes for training purposes.
- We train and evaluate the LLMs on the code execution task. Our models can generalize to new programs and achieve high accuracy.
- This work has been filed as a US patent.

*X, the moonshot factory*, Remote

2020.6-2020.9

Mineral Project

AI Resident, Host: Lianghao Li, Kangkang Wang

### **Lane detection for agriculture images**

- We develop a lane detection algorithm using the Hough transform in Python and accelerate its speed with Cython.

### **Improved weed detection with lane detection**

- We create a weed detection model based on EfficientDet.
- We integrate the lane detection algorithm with the weed detection model to enhance overall weed detection performance.

*University of California San Diego*, San Diego

2019.9-Now

Su Lab

Graduate Research Assistant, Host: Hao Su

### **Embodied AI**

- We develop generalizable manipulation skill benchmarks, ManiSkill, to evaluate the generalization ability of manipulation skills.
- We develop reinforcement learning algorithms and imitation learning algorithms for robotic tasks.

### **Computer Vision**

- We develop 3D perception algorithms, such as 3D mesh convex decomposition, and 3D part segmentation.
- We integrate 3D representation learning with reinforcement learning algorithms for robotic tasks.

### **Reasoning**

- We develop algorithms to enhance reasoning abilities using LLMs.

## **TECHNIQUE SKILLS**

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Programming Language: Python, C, C++.

Deep Learning: PyTorch, Tensorflow, Jax, Pytorch CUDA extension.

**Large Models Related Skills:** Quantization, Distributed training, Fine-tuning, Pre-training dataset processing.

Parallel Computing: MPI, OpenMP, CUDA, AVX.

Simulation: SAPIEN, MuJoCo.

Additional Skills: Pybind, ROS.

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