

# Dongqi Zuo

Graduate Student, Department of Mechanical Engineering  
University of California, Berkeley  
Berkeley, CA, United States

dongqizuo@gmail.com — +1-341-688-5508 — dongqizuo.github.io

## RESEARCH INTERESTS

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Large Language Models for Robotics, Embodied Planning and Control, Optimization and Task-Level Reasoning.

## EDUCATION

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**University of California, Berkeley**, Berkeley, United States Jul. 2024 — Jun. 2025  
Master of Mechanical Engineering, *Track: Robotics and Automatic Control*

### Joint Degree Program

**University of Cincinnati**, Cincinnati, United States Sep. 2019 — May. 2024  
*Bachelor of Science: Mechanical Engineering*

**Chongqing University**, Chongqing, China Sep. 2019 — May. 2024  
*Bachelor of Engineering: Mechanical Engineering*

## RESEARCH PROJECT

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### LLM for Cognitive Robotics

**LLM-Attacker: Generating Adversarial Agents for Autonomous Driving Safety** Beijing, China (Remote)  
*Peking University | Adviser: Prof. Zhouchen Lin* Jan. 2025 — May. 2025

- Propose an LLM-based adversarial approach for generating attacker agents to evaluate autonomous driving algorithms.
- Demonstrate improved diversity and effectiveness of failure-inducing scenarios in CARLA and real-world datasets.

**Optimal Leader Communication Algorithm for Multi-LLMs Coordination** Berkeley, USA  
*University of California, Berkeley | Adviser: Assoc. Prof. Negar Mehr* Nov. 2024 — Jan. 2025

- Develop a decentralized task allocation and coordination framework for coordinating multiple LLM-powered agents.
- Introduce dynamic role assignment and interaction protocols to improve task allocation and streamline collaboration.
- Achieve 89% success rate in multi-robot grasping tasks with 30% reduction in communication overhead compared to traditional centralized coordination approaches.

**RADI: Robotic Action Decomposition and Imagination via LLM World Models** Beijing, China (Remote)  
*Peking University | Adviser: Prof. Zhouchen Lin* May. 2024 — Nov. 2024

- Introduce a novel World Model paradigm where an LLM imagines, decomposes, and self-corrects tasks to enable reasoning.
- Achieve 98% executability and 97% success rate on long-horizon robotic tasks in *VirtualHome* under zero-shot conditions. (evaluated on 400 task scenarios, 12% improvement over ReAct Method.)

### Planning and Control

**Flight Energy Optimization with Recurrent Neural Networks** Berkeley, USA  
*University of California, Berkeley | Adviser: Assoc. Prof. Mark Mueller* Sep. 2024 — Jun. 2025

- Propose a data-driven framework using RNN to model and predict drone energy consumption of various mission conditions.
- Demonstrate a 34% energy reduction over baseline methods (RAPIDS) through RNN-based predictive optimization.
- Construct a drone platform to validate the proposed energy optimization framework in real-world flight conditions.

**Human-Machine Skill Transfer and Interaction Control Algorithm** Cincinnati, USA  
*University of Cincinnati | Adviser: Prof. Ye He* Sep. 2023 — Jun. 2024

- Propose a unified algorithm that learns trajectory patterns and stiffness profiles from human demonstrations for skill transfer.
- Use dynamic movement primitives to encode demonstrated trajectories with temporal modulation and spatial generalization.
- Extract stiffness profiles from electromyographic signals for compliant control, achieving 91% success rate across 50 manipulation tasks (compared to 67% for fixed-impedance control).

**TASR-ChOA: Twin-Adaptive Stochastic Reinforcement Chimp Optimization Algorithm** Tianjin, China  
*Tianjin University | Adviser: Prof. Yuxian Hou* Jan. 2021 — May. 2022

- Introduce twin-adaptive reinforcement to balance exploration and exploitation in global optimization tasks.
- Achieve 12% improvement in convergence speed on standard benchmarks (CEC2017) compared to traditional ChOA.
- Outperform 31 state-of-the-art metaheuristic algorithms with at least 5% improvement across 10 real-world problems.

## Robotic System Design

### Autonomous Mobile Robot Platform Design

University of Illinois Urbana-Champaign | Adviser: Prof. Naira Hovakimyan

Urbana-Champaign, USA

Jun. 2023 — Sep. 2023

- Participate in the mechanical structure and embedded firmware development of a custom autonomous mobile robot platform.
- Implement real-time trajectory re-planning using optimization-based local planning and dynamic environment perception.
- Validate the system in 12 challenging domestic environments, demonstrating 92% successful navigation through narrow passages and dynamic obstacle scenarios.

## PUBLICATIONS

**Zuo, D.\***, et al. "RADI: LLMs as World Models for Robotic Action Decomposition and Imagination." *ICLR Workshop on World Model* 2024, published. Under review at *NeurIPS* 2025.

**Zuo, D.\***, et al. "Traffic-Attacker: LLMs as Generating Adversarial Agents for Autonomous Driving Safety." Under review at *NeurIPS* 2025.

**Zuo, D.\***, et al. "TASR-ChOA: Twin-Adaptive Stochastic Reinforcement in Metaheuristic Optimization." *IEEE Robotics and Automation Letters (RA-L)*, under review (two rounds of rebuttal completed).

\* *Indicates first authorship.*

## AWARDS

### Outstanding Graduate Award, Chongqing University

Recognized for academic excellence and overall performance upon graduation

Chongqing, China

Jun. 2024

### China International "Internet+" Student Innovation and Entrepreneurship Competition

National Silver Prize for engineering-driven entrepreneurship project

China

Oct. 2021

### Siemens Cup China Intelligent Manufacturing Challenge Competition

National Silver Prize for autonomous manufacturing system design

China

Jun. 2020

### Academic Scholarship, Chongqing University

Awarded for consistent academic excellence

Chongqing, China

2020–2024 (5 times)

### Annual Outstanding Student Award, Chongqing University

Awarded annually for academic and personal excellence

Chongqing, China

2020–2024 (5 times)

## LAB & COMPANY EXPERIENCES

### School of Intelligence Science and Technology, Peking University

Remote Visiting Student

Beijing, China (Remote)

May. 2024 — Present

- Conduct research on LLM-based cognitive planning in robotic systems.

### The Grainger College of Engineering, University of Illinois Urbana-Champaign

Summer Research Intern

Urbana-Champaign, USA

Jun. 2023 — Sep. 2023

- Assisted in AMR hardware design and navigation algorithm development.

### School of Computer Science, Tianjin University

Research Assistant

Tianjin, China

May. 2021 — May. 2022

- Proposed TASR-ChOA algorithm for global optimization tasks.

Remote Visiting Student

Jan. 2021 — May. 2021

- Studied NLP and genetic algorithms for text-based sentiment and pattern analysis.

### Siemens Ltd., China

Technical Engineer Intern

Beijing, China

Apr. 2020 — Sep. 2020

- Developed intelligent production lines with machine vision, robotic arms, and AGVs.

## TECHNICAL SKILLS

**Programming Languages:** Python, C++, MATLAB

**Machine Learning Frameworks:** PyTorch, TensorFlow, scikit-learn

**Robotics Tools:** ROS/ROS2, Gazebo, CARLA, VirtualHome, MoveIt, Unreal

**Hardware Platforms:** ROKAE&UR Robot arm, Arduino, Raspberry Pi, NVIDIA Jetson

**Languages:** English (TOEFL: 103, GRE: 334)