

# Lingfan Bao

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## EDUCATIONAL BACKGROUND

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**University College London, UK** Oct.2024- Now

- *PhD in Computer Science*

**University of Leeds, UK** Nov.2023- Aug.2024

- *PhD in Mechanical Engineering*

**University of Southern California, USA** Jan.2021- Jan. 2023

- *MS in Mechanical Engineering*
- GPA:3.883/4.0
- Core coursework: Robot Dynamics and Control, Advanced Dynamics, Machine Learning and Computational Physics

**Technological University Dublin, Ireland** Sept. 2019 - June 2020

- *Bachelor of Engineering in Mechanical Engineering*
- First-Class Honors, GPA 3.71/4.0

**Nanjing Tech University, China** Sept. 2016 - June 2019

- *Bachelor of Engineering in Mechanical Engineering*
- GPA 3.50/4.0

## PUBLICATION

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- Chuong Nguyen, **Lingfan Bao (co-first author)**, Quan Nguyen, *Continuous Jumping for Legged Robots on Stepping Stones via Trajectory Optimization and Model Predictive Control, the 61st IEEE Conference on Decision and Control. Accepted*
- Chuong Nguyen, **Lingfan Bao (co-first author)**, Quan Nguyen, *Mastering Agile Jumping Skills from Simple Practices with Iterative Learning Control, International Conference on Robotics and Automation (ICRA) 2025 Conference. Under Review*
- **Lingfan Bao**, Joseph Humphreys, Tianhu Peng, Chengxu Zhou, *Deep Reinforcement Learning for Bipedal Locomotion: A Brief Survey, Artificial Intelligence Review, 2024. Under Review.*
- Tianhu Peng, **Lingfan Bao**, Joseph Humphreys, Andromachi Maria Delfaki, Dimitrios Kanoulas, Chengxu Zhou, *Learning Bipedal Walking on a Quadruped Robot via Adversarial Motion Priors, TAROS 2024. Accepted.*
- Tianhu Peng, **Lingfan Bao**, Chengxu Zhou, *Gait-Conditioned Reinforcement Learning with Multi-Phase Curriculum for Humanoid Locomotion, 2025 IEEE-RAS 24th International Conference on Humanoid Robots (Humanoids). Accepted.*
- Lingfan Bao, Yan Pan, Tianhu Peng, Dimitrios Kanoulas, Chengxu Zhou. *Hierarchical Intention-Aware Expressive Motion Generation for Humanoid Robots. 2026 IEEE International Conference on Robotics and Automation (ICRA). Under Review.*

## RESEARCH EXPERIENCES

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**Robot Perception and Learning Lab, University College London (PhD program)** Oct.2024- Now

Advisor: Dr. Chengxu Zhou

Project 1: Humanoid Robot Loco-manipulation

**REAL Robotics Institution, University of Leeds (PhD program)** Nov.2023 – Sept.2024

Advisor: Dr. Chengxu Zhou

Project 1: HECTOR bipedal robot building up

- Reproduce the HECTOR project transforming A1 quadruped robot to a bipedal configuration
- Conduct a comprehensive Literature Review on Reinforcement Learning applications in bipedal and humanoid robots

## **DRCL Dynamic Robotic and Control Lab, USC, USA**

Jun. 2021- Jun. 2023

Advisor: Prof. Quan Nguyen

*Project 1: Long Term Walking Quadruped Robot motion planning via Trajectory Optimization*

(Independent Project)

- Designed Trajectory Optimization framework generating long term walking trajectory for quadruped robot
- Optimized Long term walking Gaits (contact schedule) through parameterization method. The framework is based on the single rigid body dynamics (SRBD) and includes other several constraints

*Project 2: Continuous Jumping for Legged Robots on Stepping Stones via Trajectory Optimization and Model Predictive Control*

- Designed a framework that combines trajectory optimization and model predictive control to perform consecutive jumping on stepping stones
- Utilized trajectory optimization for full-non-linear dynamics to formulate periodic jumps for various jumping distances, and solve the problems off-lines. The different TO references are stored in the gait library
- Designed jumping controller based on model predictive control for dynamic jumping transitions, enabling the robot to achieve continuous jumps on stepping stones
- Validated the proposed framework to be robust to platforms with unknown high perturbations and model uncertainty
- Conducted experiments to show the robustness of our jumping controller on an unknown uneven platform
- Drafted the manuscript and submitted it to *IEEE Conference on Decision and Control* as the co-first author

*Project 3: Practicing Simple to Complex Jumping via Iterative Learning Control*

- Designed a framework that trajectory optimization generated different jumping distance references, and then MPC-ILC improved the tracking performance
- Utilized trajectory optimization for full-non-linear dynamics to formulate jumps for various jumping distances, including all contact, rear contact, and flight phase
- Designed an MPC-ILC framework for the Linear Sing Rigid Body dynamics model to improve the quadruped robot jumping performance and finally reach the desired final landing pose based on previous trails' errors

## **Technological University Dublin**

Oct. 2019-May 2020

*Project: Air Suspension System (undergraduation thesis)*

- Designed an air suspension experiment equipment which is able to test different control theory
- Designed all components based on the parameters of motor and ball. Validated the fitness of all components in simulation. Processed all components by 3D printing, lazer cut, lathe etc
- Designed the circuit connecting camera sensor and the DC-motor based on the Raspberry Pi
- Designed the measurement system recognizing and locating the ball in a given coordinate based on the color separation recognition algorithm
- Validated the Air Suspension System by a designed PID feedback controller that lift the ball to the desired position
- Wrote the undergraduate thesis and achieved Grade A

## **Department of Electrical Engineering Lab, Tsinghua University**

Sep. 2018-May 2019

*Project 1: Mini Robot*

- Designed low-cost 3D-print quadruped robot hardware
- Designed the circuit connecting the servos and the sensors
- Validated the quadruped robot by designed walking gaits different
- Testing different obstacle avoidance algorithms with different kinds of sensors

*Project 2: Machine learning Mnist based on Dynamic Vision Sensor*

- Conducted research on Dynamic Vision System (DVS)
- Gathered images of handwriting of number 1-9

- Used data set to train the model and achieved accuracy of 97%

*Project 3: Rescue Robot*

- Conducted research on different kinds of mini-robots working for field rescue
- Designed a 3D model of new rescue robot
- Picked up applicable components and assembled it
- Tested and analyzed the performance of the robots

**Automation Robotic Lab**, Nan Jing Tech University

Jul. 2017-Jun. 2018

*Project: Robotic Arm based on Pneumatic Tendon*

- Conducted research on the mechanism pneumatic tendon
- Designed a 3-D robotic arm
- Picked up components and assembled robotic arms manually
- Analyzed movement of robotic arms by CREO software

**SKILLS**

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- Proficient in CAD, MATLAB, C++, Python, ROS, CREO/ Pro.E, Force simulation, Mechanism movement simulation