Qingbiao **Li**

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About me

- Proficient coding skills in Python with strong knowledge in robot learning, graph neural networks, imitation learning and reinforcement learning.
- Delivered multiple programs for research and personal projects with demonstrable and solid results.
- Hands–on experience in applying ML to optimise real world engineering designs.
- Excellent problem solver and avid learner.

Programming Skills Python, Pytorch, Pytorch Geometric, Deep Graph Library (DGI), MATLAB, LaTeX, NumPy

Education

University of Cambridge — *Cambridge, UK*

PhD in Computer Science — *Oct 2018 - Present*

- **Research interest**: Multi-Agent Systems (MAS) or Multi-robot Systems (MRS)
  - Develop optimal multi-agent path planning framework with trainable communication policy for heterogeneous agents/robots in cooperative tasks, including mobility-on-demand, automated warehouse and smart cities.
  - Proposed Graph Neural Networks to build communication channels to share information between agents.

Imperial College London — *London, UK*

MRes Medical Robotics and Image Guided Intervention (Distinction) — *Oct 2017 - Sep 2018*

Individual Project: Developed tissue oxygenation saturation monitoring technique based on optical imaging (RGB and Hyperspectral Imaging) by conditional generative adversarial networks (cGAN). The results have been published in **IJCARS-IPCAI 2019**.

University of Edinburgh — *Edinburgh, UK*

M. Eng (Hons) Mechanical Engineering — *Sep 2013 - June 2016*

Individual Project: Missile Impact on Snow inspried by project from British Antarctic Survey

South China University of Technology — *Guangzhou, China*

B. Eng. Mechanical Engineering and Automation — *Sep 2011 - July 2013*

MOOC Certificate

Artificial Intelligence Planning; Introduction to Robotics; Machine Learning Techniques; An introduction to Interactive Programming in Python;

Work Experience

Teaching Assistant / Lab Demonstrator in Multi-Robot Systems (MRS) — *Cambridge, UK*

Department of Computer Science and Technology, University of Cambridge — *Jan 2019 - Present*

- Provided Q and A session with students about practical assignments, and supervised students' mini-project.
- Simulation environment ROS and AWS RoboMaker, physical experiment using TurtleBot.

Class Representative of MRes Medical Robotics and Image Guided Intervention — *London, UK*

Department of Surgery and Cancer, Imperial College London — *Oct 2017 - Sep 2018*

- Assisted course organiser in the establishing course and organizing extracurricular activities.

Academic Research Internship in Legged robots — *Hangzhou, Zhejiang, China*

Intelligence Robots Lab, Zhejiang University — *June 2017 - Sep 2017*

- Trajectory planning and generation of bipedal walking in Linear Inverted Pendulum (LIPM) in physical experiment.
- Implemented robust control of bipedal walking via online parameter estimation.

Research Assistant in Bipedal Walking of Humanoid Robot

Edinburhg, UK

SLMC, School of Informatics, The University of Edinburgh

Sep 2016 - June 2017

- Investigated innovative approaches to achieve model-free control of biped walking for humanoid robots.
- Theoretical proof and simulation validation of online parameter estimation based on Tikhonov regularisation to obtain robust control of bipedal walking.
- The results have been published in **Humanoids 2017**.

Industrial Robotics Research Assistant (Funded by Erasmus+)

Hannover, Germany

The Institute of Production Engineering and Machine Tools (IFW), Leibniz University of Hanover

Sep 2016 - June 2017

- Mechanism design for industrial robot for industrial-level milling process.
- CAD modelling of innovative design of transmission device.
- Kinematic simulation to analyse torque distribution during operation.

Teaching Assistant

Edinburgh, UK

School of Engineering, The University of Edinburgh

Jan 2016 - Nov 2016

- **Mechanical Engineering 1**
  - Basic of Statics and Dynamics, Solid Mechanics and Thermodynamics
- **Fluid Mechanics 2**
  - Fluid Statics, Bernoulli's Equation, Hydraulic Structures.

Publications

Journal Articles

Binyu Wang, Zhe Liu, **Qingbiao Li**, Amanda Prorok. "Mobile Robot Path Planning in Dynamic Environments through Globally Guided Reinforcement Learning"

IEEE Robotics and Automation Letters (2020). 2020. PDF

Qingbiao Li, Jianyu Lin, Neil T Clancy, Daniel S Elson. "Estimation of Tissue Oxygen Saturation from RGB Images and Sparse Hyperspectral Signals based on Conditional Generative Adversarial Network"

International journal of computer assisted radiology and surgery 14.6 (2019) pp. 987–995. Springer, 2019. PDF

Conference Proceedings

Qingbiao Li, Fernando Gama, Alejandro Ribeiro, Amanda Prorok. "Graph Neural Networks for Decentralized Multi-robot Path Planning"

IEEE/RSJ International Conference on Intelligent Robots and Systems, 2020, PDF

Qingbiao Li, Fernando Gama, Alejandro Ribeiro, Amanda Prorok. "Graph Neural Networks for Decentralized Path Planning"

Proceedings of the 19th International Conference on Autonomous Agents and MultiAgent Systems, 2020, PDF

Qingbiao Li, Xiao-Yun Zhou, Jianyu Lin, Jian-Qing Zheng, Neil T Clancy, Daniel S Elson. "Estimation of Tissue Oxygen Saturation from RGB Images based on Pixel-level Image Translation"

The Hamlyn Symposium on Medical Robotics, 2018, 2018, PDF

Jian-Qing Zheng, Xiao-Yun Zhou, **Qingbiao Li**, Celia Riga, Guang-Zhong Yang. "Abdominal Aortic Aneurysm Segmentation with a Small Number of Training Subjects"

The Hamlyn Symposium on Medical Robotics, 2018, 2018, PDF

Qingbiao Li, Iordanis Chatzinikolaidis, Yiming Yang, Sethu Vijayakumar, Zhibin Li. "Robust Foot Placement Control for Dynamic Walking using Online Parameter Estimation"

2017 IEEE-RAS 17th International Conference on Humanoid Robotics (Humanoids), 2017, PDF

Projects

Vision-based Navigation in Flexible Endoscopy *London, UK*

Imperial College London, supervised by **Dr George Mylonas** *Sep 2017 - Dec 2020*

- This project was proposed to track the endoscope pose in real time during flexible endoscopy and generate 3D point cloud or map human colon simultaneously.
- Investigated available visual-inertial SLAM and customize them for small scale, near focus.
- Conclusive registration and surface reconstruction based on point cloud was obtained by SLAM in our pipeline.

Missile Impact on Snow (MEng thesis) *Edinburgh, UK*

University of Edinburgh, supervised by **Dr Filipe Teixeira-Dias** *Oct 2015 - Apr 2016*

- This study was proposed to support the optimization of designing the impactor developed by British Antarctic survey for long-time tracking on the motion of glacier.
- Investigated the characteristics of the impact dynamics of the impactor and its interaction with different types of snow, covering a range of impact energies.
- Signal processing of data from accelerometer, and statistics analysis on the result.
- Mechanical Design of the impactor.
- Postgraduate thesis with distinction.

Honors & Awards

PhD Studentship *2018-2021*

Department of Computer Science and Technology, University of Cambridge

Subsystem Excellence Award at Hyperloop Pod Competition *2016*

Space Exploration Technologies Corporation

International Student Scholarship *2013-2016*

The University of Edinburgh

First Prize - "ThyssenKrupp" Elevator Cab Design Competition, Concept design for next generation elevator. *2012*

School of Automation Science and Engineering, South China University of Technology

Language Proficiency

English	Fluent
Chinese	Mandarin (Native), Cantonese (Intermediate), Hakka Dialect (Native)
German	Basic (Passed A2)