

# Tingguang (Teagan), LI

Email: [tgli0809@gmail.com](mailto:tgli0809@gmail.com), Tel: (86)14714305642

Homepage: <http://www.ee.cuhk.edu.hk/~tgli/>

## EDUCATION

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<b>The Chinese University of Hong Kong</b> <i>Ph.D. candidate in Robotics, Perception and AI Laboratory, Electronic Engineering</i>	<b>Hong Kong, China</b> 08/2016 – Present
➤ <b>Supervisor:</b> Prof. Max Qing-Hu Meng	
➤ <b>Research interests:</b> Deep Reinforcement Learning, In-Hand Manipulation, Robot Exploration	
<b>Stanford University</b> <i>Visiting Student Researcher in Artificial Intelligence Laboratory (SAIL), Computer Science Department</i>	<b>Palo Alto, CA, US</b> 02/2019 – 08/2019
➤ <b>Supervisor:</b> Prof. Jeannette Bohg, Dr. Wenzhen Yuan	
➤ <b>Research project:</b> Learning Hierarchical Control for Robust In-Hand Manipulation	
<b>Nanjing University</b> <i>B.Eng. in Control and System Engineering</i>	<b>Nanjing, China</b> 09/2012 – 06/2016
➤ <b>Academics:</b> GPA: 90.8/100, Rank: 1/25	
➤ <b>Courses:</b> Computer Vision, Artificial Intelligence, Advanced Programming Language, Data Structure	
➤ <b>Final year project</b> (Best Undergraduate Thesis of Jiangsu Province): A Quadrotor Control Policy Based on Hand Gesture Recognition Using Hidden Markov Model	

## RESEARCH PROJECTS

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<b>Hierarchical Control for In-Hand Manipulation</b>	06/2018 - Present
➤ Learn to solve a Rubik's cube: implemented model-free reinforcement learning to separately learn atomic actions of manipulating a Rubik's cube; employed a high-level cube solver to design an action trajectory to solve a Rubik's cube	
➤ Learn to manipulate objects to challenging poses: designed motion primitives with low-level torque controllers to keep stable contacts and trained a high-level reinforcement learning policy to alternate between motion primitives	
<b>Data-Driven Robot Exploration in Indoor Environments</b>	07/2017 - Present
➤ Built a large-scale indoor layout dataset <i>HouseExpo</i> containing 35,357 2D floor plans with 252,500 rooms	
➤ Developed an efficient simulation platform <i>Pseudo-SLAM</i> that simulates SLAM process and can transfer its learned policy to physical robots without fine-tuning	
<b>Autonomous Luggage Trolley Collection Robot for Hong Kong airport</b>	06/2018 - Present
➤ Developed a mobile robot with the ability to recognize, approach and manipulate luggage trolleys autonomously	
➤ Take charge of visual servo and pose estimation module (visual fiducial solution and deep learning solution)	
<b>ICRA2017 DJI RoboMaster Mobile Manipulation Challenge</b>	01/2017 - 05/2017
➤ Developed a mobile manipulator which can recognize, pick, transport and stack blocks autonomously	
➤ Piled up 10 cubes (20 cm * 20 cm * 20 cm) and won the 5th prize out of 93 teams in the final competition	

## PAPERS

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- [1] **Tingguang Li**, Krishnan Srinivasan, Max Q.-H. Meng, Wenzhen Yuan, Jeannette Bohg. Learning Hierarchical Control for Robust In-Hand Manipulation, submitted to the Conference on Robot Learning (CoRL), 2019.
  - [2] **Tingguang Li**, Danny Ho, Chenming Li, DeLong Zhu, Chaoqun Wang, Max Q.-H. Meng. HouseExpo: A Large-scale 2D Indoor Layout Dataset for Learning-based Algorithms on Mobile Robots, arXiv preprint arXiv:1903.09845.
  - [3] **Tingguang Li**, Weitai Xi, Jia Xu, Max Q.-H. Meng. Learning to Solve a Rubik's Cube Using a Dexterous Hand, <https://arxiv.org/abs/1907.11388>.
  - [4] **Tingguang Li**, DeLong Zhu, Max Q.-H. Meng. A Hybrid 3DoF Pose Estimation Method Fusing Camera and Lidar Data, IEEE International Conference on Robotics and Biomimetics (ROBIO), 2017. (**Best Conference Paper Award Finalist**)
  - [5] DeLong Zhu\*, **Tingguang Li**\*, Danny Ho\*, Chaoqun Wang, Max Q.-H. Meng. Deep Reinforcement Learning Supervised Autonomous Exploration in Office Environments, IEEE International Conference on Robotics and Automation (ICRA), 2018. (\* indicates equal contribution.)
  - [6] DeLong Zhu, **Tingguang Li**, Danny Ho, Tong Zhou, and Max Q.-H. Meng. A Novel OCR-RCNN for Elevator Button Recognition, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018.
  - [7] **Tingguang Li**, Jin Pan, DeLong Zhu, Max Q.-H. Meng. Learning to Interrupt: A Hierarchical Deep Reinforcement Learning Framework for Efficient Exploration, IEEE International Conference on Robotics and Biomimetics (ROBIO), 2018.
  - [8] Danny Ho, **Tingguang Li**, Max Q.-H. Meng. Bone Drilling Breakthrough Detection via Energy-based Signal, International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2018.

## INTERNSHIPS & TRAININGS

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### Tencent Technologies Co., Ltd.

Shenzhen, China

Research intern in AI Lab, supervised by Jia Xu

07/2018 – 01/2019

- Developed an in-hand manipulation system that can solve a 2x2 Rubik's cube with a dexterous hand in simulation
- The system combined a high-level cube solver and low-level model-free atomic actions and achieved 90% success rate in solving any randomly scrambled Rubik's cubes

## SCHOLARSHIPS & AWARDS

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<b>Hong Kong Ph.D. Fellowship</b> (The highest scholarship among postgraduate students in Hong Kong)	08/2016
<b>Best Conference Paper Award Finalist</b> of Robotics and Biomimetics 2017 (5/558)	12/2017
<b>ICRA 2017 DJI RoboMaster Mobile Manipulation Challenge Finalists</b> (5/93)	05/2017
<b>Outstanding Student Award</b> of The Chinese University of Hong Kong (Top 3%)	10/2018
<b>Best Undergraduate Thesis</b> of Jiangsu Province (Top 3%)	07/2016
<b>National Undergraduate Scholarship</b> (Top 1%)	10/2015
<b>IROS 2018 Travel Award</b>	10/2018
<b>ICRA 2018 Student Travel Award</b>	05/2018
<b>Outstanding Undergraduate Award of Nanjing University</b> (Top 15%)	05/2016
<b>Outstanding Student</b> of Nanjing University (Top 5%)	04/2015

## PATENTS

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- **Li Tingguang**, Chen Chunlin, Wang Wenqing, Dou Yuhao, Su Sanbao, Li Bowen, Zhu Zhangqing, Xin Bo. "A lidar 3D image reconstruction method based on quadrotor in indoor environments", CN105334518B, Nov. 11, 2015.

## TECHNICAL SKILLS

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### Programming:

- Experienced in C/C++, Python, Git, Matlab, LaTeX

### Frameworks:

- Deep Learning: TensorFlow, PyTorch
- Robotics: OpenCV, Robot Operating System (ROS), Mujoco, PyBullet, Gazebo

## TEACHING EXPERIENCE

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### Teaching Assistant:

- BMEG 4130: Biomedical Modeling, instructed by Prof. Max Q.-H. Meng
- ELEG 2230: Digital Circuits and Computing Systems, instructed by Mr. YIP Kim Fung

## ACADEMIC SERVICES

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### Referee Services

- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2018, 2019
- International Conference on Information and Automation (ICIA), 2017, 2018
- International Conference on Advanced Robotics (ICAR), 2017

### Presentations:

- IROS 2018, Madrid, Spain
- ICRA 2018, Brisbane, Australia
- ROBIO 2017, Macau, China