

Boyang LI

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RESEARCH INTEREST

Unmanned Aircraft System (UAS), Flight Dynamics and Control, Aerial Robotics

PROFESSIONAL EXPERIENCE

Lecturer in Aerospace Systems Engineering *since Feb. 2023*
School of Engineering [Academic Profile](#)
The University of Newcastle, Australia

Research Assistant Professor *Jul. 2020 - Jan. 2023*
Department of Aeronautical and Aviation Engineering
The Hong Kong Polytechnic University, Hong Kong

Research Associate *Jul. 2019 - Jun. 2020*
School of Engineering
The University of Edinburgh, UK *with Prof. Adam Stokes*

Research Fellow *Jan. 2019 - Jun. 2019*
Air Traffic Management Research Institute
Nanyang Technological University, Singapore *with Prof. Kin Huat Low*

EDUCATION

Doctor of Philosophy (Ph.D.) *2015 - 2018*
The Hong Kong Polytechnic University, Hong Kong *with Prof. Chih-Yung Wen*
Thesis: *Model Predictive Hover Control and Transition Optimization for a Tail-Sitter Unmanned Aerial Vehicle*

M.Eng. in Aeronautical Engineering *2012 - 2015*
Northwestern Polytechnical University, Xi'an, China *with Prof. Bifeng Song*
Thesis: *Experimental Study of a High-Lift Mechanism for 3-DOF Flapping Wings*

B.Eng. in Aeronautical Engineering *2008 - 2012*
Honors College, Northwestern Polytechnical University, Xi'an, China

PUBLICATIONS (*' for corresponding author)

Journal

- [1] W. Yang, H. Luo, K.W. Tse, H. Hu, **B. Li**, C.Y. Wen, "Autonomous Targetless Extrinsic Calibration of Thermal, RGB, and LiDAR Sensors," *IEEE Transactions on Instrumentation & Measurement*, Accepted.
- [2] L.Y. Lo, **B. Li**, C.Y. Wen, C.W. Chang, "Experimental Non-Robocentric Dynamic Landing of

Quadrotor UAVs with On-Ground Sensor Suite,” *IEEE Transactions on Instrumentation & Measurement*. Accepted.

- [3] Y. Yang, T. Huang, T. Wang..., **B. Li***, “Sampling-Efficient Path Planning and Improved Actor-Critic-Based Obstacle Avoidance for Autonomous Robots,” *Sci. China Inf. Sci.* vol. 67, 2024.
- [4] H. Devaraj, S. Sohail, M. Ooi, **B. Li**, et al., “RuralAI in Tomato Farming: Integrated Sensor System, Distributed Computing, and Hierarchical Federated Learning for Crop Health Monitoring,” *IEEE Sensors Letters*, vol. 8, no. 5, 2024.
- [5] Y. Hu, **B. Li**, B. Jiang, J. Han, and C.-Y. Wen, “Disturbance Observer-Based Model Predictive Control for an Unmanned Underwater Vehicle,” *Journal of Marine Science and Engineering*, vol. 12, no. 1, 2024.
- [6] H. Zhang, B. Li, **B. Li**, and C. Yang, “Influence of Propeller Parameters on the Aerodynamic Performance of Shrouded Coaxial Dual Rotors in Hover,” *Aerospace*, vol. 10, no. 10, 2023.
- [7] B. Jiang, **B. Li***, W. Zhou, L.-Y. Lo, C.-K. Chen, C.-Y. Wen, “Neural Network Based Model Predictive Control for a Quadrotor UAV,” *Aerospace*, vol. 9, no. 8, 2022.
- [8] H. Hu, **B. Li***, W. Yang, and C.-Y. Wen, “A Novel Multispectral Line Segment Matching Method Based on Phase Congruency and Multiple Local Homographies,” *Remote Sensing*, vol. 14, no. 16, 2022.
- [9] S. Chen, W. Zhou, A.-S. Yang; H. Chen, **B. Li***, C.-Y. Wen, “An End-to-End UAV Simulation Platform for Visual SLAM and Navigation,” *Aerospace*, vol 9, no. 48, 2022.
- [10] M. Sayed, J. Roberts, K. Donaldson, S. Mahon, F. Iqbal, **B. Li**, S. Aixela, G. Mastorakis, E. Jonasson, M. Nemitz, S. Bernardini, and A. Stokes, “Modular Robots for Enabling Operations in Unstructured Extreme Environments,” *Advanced Intelligent Systems*, vol. 4, no. 5, 2022.
- [11] J. Li, H. Xie, K. H. Low, J. Yong, **B. Li**, “Image-based Visual Servoing of Rotorcrafts to Planar Visual Targets of Arbitrary Orientation”, *IEEE Robotics and Automation Letters*, vol. 6, no. 4, 2021.
- [12] Y. Chu, C. Ho, Y. Lee, **B. Li***, “Development of a Solar-Powered Unmanned Aerial Vehicle for Extended Flight Endurance,” *Drones*, vol. 5, no. 2, 2021.
- [13] L.-Y. Lo, C. H. Yiu, Y. Tang, A. S. Yang, **B. Li***, and C.-Y. Wen, “Dynamic Object Tracking on Autonomous UAV System for Surveillance Applications,” *Sensors*, vol. 21, no. 23, 2021.
- [14] R. Gabl, T. Davey, Y. Cao, Q. Li, **B. Li**, K. L. Walker, F. Giorgio-Serchi, S. Aracri, A. Kiprakis, A. A. Stokes, D. M. Ingram, “Hydrodynamic loads on a restrained ROV under waves and current,” *Ocean Engineering*, vol. 234, 2021.
- [15] Y. Feng, K. Tse, S. Chen, C.Y. Wen, and **B. Li***, “Learning-Based Autonomous UAV System for Electrical and Mechanical (E&M) Device Inspection,” *Sensors*, vol. 21, no. 4, p. 1385, 2021.
- [16] **B. Li**, J. Sun, W. Zhou, C.Y. Wen, K.H. Low, C.K. Chen, “An Optimal Transition Control Method

- for Tail-sitter VTOL UAVs,” *IEEE/ASME Transactions on Mechatronics*, vol. 25, no. 5, 2020.
- [17] J. Sun, **B. Li**, C.Y. Wen, and C.K. Chen, “Model-Aided Wind Estimation Method for a Tail-Sitter Aircraft,” *IEEE Transactions on Aerospace and Electronic Systems*, vol. 56, no. 2, 2020.
- [18] W. Zhou, S. Chen, C.W. Chang, C.Y. Wen, C.K. Chen, and **B. Li***, “System Identification and Control for a Tail-Sitter Unmanned Aerial Vehicle in the Cruise Flight,” *IEEE Access*, vol. 8, 2020.
- [19] C. W. Chang, S. Chen, C.Y. Wen, and **B. Li***, “An Actuator Allocation Method for a Variable-Pitch Propeller System of Quadrotor-based UAVs,” *Sensors*, vol. 20, no. 19, 2020.
- [20] Y. Cao, **B. Li**, Q. Li, A. A. Stokes, D. Ingram, and A. Kiprakis, “A Nonlinear Model Predictive Controller for Remotely Operated Underwater Vehicles with Disturbance Rejection,” *IEEE Access*, vol. 8, 2020.
- [21] Q. Li, Y. Cao, **B. Li**, D. M. Ingram, and A. Kiprakis, “Numerical Modelling and Experimental Testing of the Hydrodynamic Characteristics for an Open-Frame Remotely Operated Vehicle,” *Journal of Marine Science and Engineering*, vol. 8, no. 9, 2020.
- [22] R. Gabl, T. Davey, Y. Cao, Q. Li, **B. Li**, K. L. Walker, F. Giorgio-Serchi, S. Aracri, A. Kiprakis, A. A. Stokes, D. M. Ingram, “Experimental Force Data of a Restrained ROV under Waves and Current,” *Data*, vol. 5, no. 3, 2020.
- [23] W. Zhou, **B. Li**, J. Sun, C.Y. Wen, C.K. Chen, “Adaptive Model Predictive Control Method for a Tail-Sitter VTOL UAV”, *Control Engineering Practice*, vol. 91, 2019.
- [24] J. Sun, **B. Li**, C.-Y. Wen, and C.-K. Chen, “Design and Implementation of a Real-time Hardware-in-the-loop Testing Platform for a Dual-rotor Tail-sitter Unmanned Aerial Vehicle,” *Mechatronics*, vol. 56, 2018.
- [25] **B. Li**, W. Zhou, J. Sun, C. Y. Wen, and C. K. Chen, “Development of Model Predictive Controller for a Tail-Sitter VTOL UAV in Hover Flight,” *Sensors*, vol. 18, no. 9, 2018.
- [26] J. Sun, **B. Li**, Y. Jiang, and C. Y. Wen, “A Camera-Based Target Detection and Positioning UAV System for Search and Rescue (SAR) Purposes,” *Sensors*, vol. 16, no. 11, 2016.
- [27] **B. Li**, Y. Jiang, J. Sun, L. Cai, and C. Y. Wen, “Development and Testing of a Two-UAV Communication Relay System,” *Sensors*, vol. 16, no. 10, 2016.

Peer-reviewed Conference

- [1] H.W. Tong, **B. Li**, H. Huang, C.Y. Wen, “Coverage Path Planning for Autonomous Aircraft Inspection Using UAVs”, in *AIAA SciTech*, FL, USA, 2025.
- [2] Y. Hu, **B. Li**, C.Y. Wen, “Adaptive Model Predictive Control with Online System Identification for an Unmanned Underwater Vehicle” in *OCEANS*, Singapore, 2024
- [3] L.Y. Lo, Y. Hu, **B. Li**, C.Y. Wen and Y. Yang, “An Adaptive Model Predictive Control for Unmanned Underwater Vehicles Subject to External Disturbances and Measurement Noise,” in *14th Asian Control Conference (ASCC)*, Dalian, China, 2024.

- [4] L.Y. Lo, **B. Li**, C.Y. Wen, and C.-W. Chang, “Landing a Quadrotor on a Ground Vehicle without Airborne Sensors”, in *IEEE International Conference on Intelligent Transportation Systems (ITSC)*, Bilbao, Bizkaia, Spain, 2023.
- [5] H. W. Tong, H. Huang, **B. Li***, C.Y. Wen, “UAV Path Planning for Complete Structural Inspection using Mixed Viewpoint Generation”, in *International Conference on Control, Automation, Robotics and Vision (ICARCV)*, Singapore, 2022.
- [6] M. Ahmad, **B. Li***, “A Comparative Analysis of Turbulence Models in FLUENT for High-Lift Airfoils at Low Reynolds Number”, in *International Conference on Unmanned Aircraft Systems (ICUAS)*, Dubrovnik, Croatia, 2022.
- [7] Y. Cao, **B. Li**, Q. Li, A. A. Stokes, D. Ingram, and A. Kiprakis, “Reasoning Operational Decisions for Robots Via Time Series Causal Inference,” in *IEEE International Conference on Robotics and Automation (ICRA)*, Xi’an, China, 2021.
- [8] C. Lim, **B. Li**, E. M. Ng, X. Liu and K. H. Low, “Three-dimensional Dynamic Obstacle Perception in a Detect-and-Avoid Framework for Unmanned Aerial Vehicles,” in *2019 International Conference on Unmanned Aircraft Systems (ICUAS)*, Atlanta, GA, USA, 2019.
- [9] **B. Li**, W. Zhou, J. Sun, C. Y. Wen, and C. K. Chen, “Model Predictive Control for Path Tracking of a VTOL Tailsitter UAV in an HIL Simulation Environment,” in *AIAA Modeling and Simulation Technologies Conference*, Kissimmee, FL, USA, 2018.
- [10] J. Sun, **B. Li**, L. Shen, C. K. Chen, and C. Y. Wen, “Dynamic Modeling and Hardware-In-Loop Simulation for a Tail-Sitter Unmanned Aerial Vehicle in Hovering Flight,” in *AIAA Modeling and Simulation Technologies Conference*, Grapevine, TX, USA, 2017.
- [11] **B. Li**, B. Song; L. Wang, “A Three-dimensional Flapping Wing Mechanism for Wind Tunnel Experiments,” in *29th Congress of the International Council of the Aeronautical Sciences (ICAS)*, St. Petersburg, Russian, 2014.

Dataset

- [1] B. Jiang, **B. Li**, "Quadrotor Tail-sitter UAV Flight Log", *IEEE DataPort*, 2022.

Patent

- [1] Unmanned Vehicle Having Flight Configuration and Surface Traverse Configuration, US Patent (Provisional), 2022
- [2] Vertical take-off and landing micro air vehicle with variable X- wing, CN103979104A, 2014
- [3] Three-dimensional flapping flapping-wing drive mechanism, CN104477383A, 2014
- [4] Flight control navigation system for miniature ornithopter, CN202433775U, 2011

TEACHING

- AERO4600 Automatic Flight Control Systems, 2023 -

- AERO3000 Flight Dynamics, 2023 -
- AERO2000 Aircraft Performance and Operations, 2023 -
- ME578 Aircraft Design, 2021, 2022
- AAE4202 Electronics & Information Technologies for UAS, 2020

GRANTS

- [1] Development and Optimisation of an Air-brake System for NU Rocketry, NSW Space Research Network Student Project, CI, \$10,000, 2024
- [2] Development of a Personalised and Connected Advanced Driver Assistance System, Hong Kong Smart Traffic Fund, CI, ~\$870,000, 2023-2025
- [3] Research Centre for Unmanned Autonomous Systems, PolyU Research Centre Funding, CI, ~A\$278,000, 2022-2025
- [4] Trajectory Planning and Control for VTOL UAVs, PolyU Department Startup Fund, CI, ~A\$45,000, 2021-2023
- [5] Application of Model Predictive Control to UAV for Disturbance Rejection, PolyU University Startup Fund, CI, ~A\$55,000, 2020-2023
- [6] Design, Optimization, and Test of an Aquatic Micro Air Vehicle, PolyU International and Inter-departmental Final Year Projects (3), CI, ~A\$30,000, 2021-2023
- [7] UAV-based Remote Sensing System for Marine Environment Monitoring, PolyU Undergraduate Research and Innovation Scheme, CI, ~A\$9,000, 2021-2023
- [8] Applying GitHub to Support Undergraduate Teaching, PolyU Online Teaching Development and Educational Research Grant, CI, ~A\$176,000, 2021-2022

SUPERVISION

- [1] Co-supervisor for 8 PhD Students
- [2] Chief Supervisor for 2 MSc Students

HONORS & AWARDS

- Gold Medal, 45th International Exhibition of Inventions of Geneva, Geneva, Switzerland, 2017
- Champion, Search and Rescue Group, Taiwan UAV Competition, Taiwan, 2016
- Third Prize, AVIC Cup - International UAV Innovation Grand Prix, Beijing, China, 2013

ACADEMIC SERVICES

- Youth Editorial Board Member, *Advanced Bionics*
- Guest Editor, *Frontiers in Robotics and AI, Sensors, Electronics*
- Workshop Co-Chair, IEEE International Conference on Intelligent Transportation Systems (IEEE

ITSC 2022), Macau, China

ADMINISTRATION SERVICES

- School Marketing Committee Member
- Industrial Experience Coordinator
- CESE College Board Member

Invited Talk

- CoICT & CML-NET Research Semina, Central Queensland University, March 2024