Boyang LI

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RESEARCH INTEREST

Unmanned Aircraft System, 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 at the   *Jul. 2020 - Jan. 2023*
Department of Aeronautical and Aviation Engineering
The Hong Kong Polytechnic University, Hong Kong

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

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

EDUCATION

Doctor of Philosophy (PhD)   *Mar. 2019*
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   *Apr. 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   *Jun. 2012*
Honors College, Northwestern Polytechnical University, Xi'an, China

PUBLICATIONS (Citations 600+, H-index 15 by *Google Scholar*)

Representative Publications

[1] 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.

[2] 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.

[3] 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.

[4] **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.

[5] 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.

Journal Papers

[1] 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.

[2] 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.

[3] 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.

[4] 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.

[5] 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.

[6] 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.

[7] 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.

[8] 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.

[9] 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.

[10] 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.

[11] 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.

[12] 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.

[13] 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.

[14] **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.

[15] 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.

[16] **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.

Conference Papers

[1] 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.

[2] 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.

[3] 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.

[4] 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.

[5] **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.

[6] 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.

[7] **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.

TEACHING

- AERO3000 Flight Dynamics, Course coordinator and Lecturer, 2023

- ME578 Aircraft Design, Course coordinator and Lecturer, 2021, 2022

- AAE4202 Electronics & Information Technologies for Unmanned Aircraft Systems, Course coordinator and Lecturer, 2020

GRANTS

[1] Development of a Personalised and Connected Advanced Driver Assistance System, Smart Traffic Fund, Co-I, ~A$870,000, 2023-2025

[2] Research Centre for Unmanned Autonomous Systems, PolyU Research Centre Funding, Co-PI, ~A$278,000, 2022-2025

[3] Trajectory Planning and Control for VTOL UAVs, PolyU Department Startup Fund, PI, ~A$45,000, 2021-2023

[4] Application of Model Predictive Control to UAV for Disturbance Rejection, PolyU University Startup Fund, PI, ~A$55,000, 2020-2023

[5] Design, Optimization, and Test of an Aquatic Micro Air Vehicle, PolyU International and Inter-departmental Final Year Projects (3), PI, ~A$30,000, 2021-2023

[6] UAV-based Remote Sensing System for Marine Environment Monitoring, PolyU Undergraduate Research and Innovation Scheme, PI, ~A$9,000, 2021-2023

[7] Applying GitHub to Support Undergraduate Teaching, PolyU Online Teaching Development and Educational Research Grant, Co-PI, ~A$176,000, 2021-2022

PATENTS

[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

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

- Guest Editor for special issues of *Frontiers in Robotics and AI, Sensors, Electronics*

- Workshop Co-Chair for IEEE International Conference on Intelligent Transportation Systems (IEEE ITSC 2022), Macau, China