

Boyang LI

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RESEARCH INTEREST

Aerial Robotics, Autonomous System Navigation, Flight Dynamics and Control

PROFESSIONAL EXPERIENCE

Research Assistant Professor at the Department of Aeronautical and Aviation Engineering
The Hong Kong Polytechnic University, Hong Kong Jul. 2020 - now
[Academic Profile](#)

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

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

EDUCATION

PhD in Mechanical Engineering
The Hong Kong Polytechnic University, Hong Kong Dec. 2018
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
Northwestern Polytechnical University, Xi'an, China Apr. 2015
with Prof. Bifeng Song
Thesis: *Experimental Study of a High-Lift Mechanism for 3-DOF Flapping Wings*

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

PUBLICATIONS (Citations 429, H-index 10 by [Google Scholar](#))

Journals

- [1] S. Chen, W. Zhou, A.-S. Yang; H. Chen, **B. Li**, and C.-Y. Wen, "An End-to-End UAV Simulation Platform for Visual SLAM and Navigation." *Aerospace*, vol 9, no. 48, 2022.
- [2] M. E. Sayed, J. O. Roberts, K. Donaldson, S. T. Mahon, F. Iqbal, **B. Li**, S. Franco Aixela, G. Mastorakis, E. T. Jonasson, M. P. Nemitz, S. Bernardini, and A. A. Stokes, "Modular Robots for Enabling Operations in Unstructured Extreme Environments," *Advanced Intelligent Systems*, vol. 4, no. 5, 2022.
- [3] 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.
- [4] 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, pp. 7861-7868, 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. Chu, C. Ho, Y. Lee, and **B. Li**, “Development of a Solar-Powered Unmanned Aerial Vehicle for Extended Flight Endurance,” *Drones*, vol. 5, no. 2, 2021.
- [7] 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.
- [8] 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, pp. 218348-218359, 2020.
- [9] 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.
- [10] 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, pp. 158622-158634, 2020.
- [11] 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.
- [12] 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, Sep 2020.
- [13] **B. Li**, J. Sun, W. Zhou, C.Y. Wen, K.H. Low, and C.K. Chen, “An Optimal Transition Control Method for Tail-sitter VTOL UAVs,” *IEEE/ASME Transactions on Mechatronics*, vol. 25, no. 5, pp. 2534-2545, 2020.
- [14] 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, pp. 1262-1278, 2020.
- [15] 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, pp. 104-125, 2019.
- [16] 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, pp. 1-15, 2018.
- [17] **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.

[18] 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.

[19] **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.

Conferences

[1] W. Yang, H. Hu, **B. Li**, and Y. Yu, “4D Real-time Mapping for Thermal Inspection and Energy Auditing in GPS-Denied Environment”, in *CIB World Building Congress*, Melbourne, Australia, 2022. (*accepted*)

[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. (*accepted*)

[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

- AAE4202 - Electronics & Information Technologies for Unmanned Aircraft Systems, 2020
- ME578 - Aircraft Design, 2021, 2022

GRANTS

[1] Startup Fund, PI, HK PolyU, ~ £25,000, 2020-2023

[2] Startup Fund, PI, HK PolyU AAE Department, ~ £30,000, 2020-2023

[3] International and Inter-departmental Final Year Projects, PI, HK PolyU, ~ £17,000, 2021-2023

- [4] Undergraduate Research and Innovation Scheme, PI, HK PolyU, ~ £5,000, 2021-2023
- [5] Applying GitHub to Support Undergraduate Teaching, Co-I, HK PolyU Online Teaching Development and Educational Research Grant, ~£96,000, 2021-2022

PATENTS

- [1] Vertical take-off and landing micro air vehicle with variable X- wing, CN103979104A, 2014
- [2] Three-dimensional flapping flapping-wing drive mechanism, CN104477383A, 2014
- [3] 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*

MENTORING

- Chief Supervisor for 2 MPhil and 2 MSc Students
- Co-supervisor for 3 PhD Students
- Supervisor for 7 Undergraduate Final Year Projects