CHEUNG Hiu Ching, Athena

Robotics Researcher

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Education

- **The Hong Kong Polytechnic University (HKPolyU)** *2022-2025*

Master of Philosophy (Aeronautical and Aviation Engineering)
- Thesis title: Design and Control of a Soft Aerial Vehicle for Conducting Aerial Grasping
- Supervised by Prof. Chih-yung WEN (AAE) and co-supervised by Dr Henry K. CHU (ME)
- Affiliated with the High-speed Thermo-fluid and MAV/UAV Lab (AIRo Lab) at the Research Centre for Unmanned Autonomous Systems (RCUAS)

- **The Hong Kong Polytechnic University** *2018-2022*

Bachelor of Engineering (Honours) in Mechanical Engineering
- Dean list (2019/2020)
- FYP title: Development of an Aerial Air Quality Monitoring Platform Based on Vertical Takeoff and Landing (VTOL) Unmanned Aerial Vehicle (UAV) (Supervised by Prof. Chih-yung WEN)
- Virtual summer exchange: Girton College, Cambridge - Mathematics for Engineering Online Summer Programme, 2021

Publication

- **H. C. Cheung**, W. Yue, Z. Han, M. Chen, G. Cao, H. Liu, H. Ren "Learning-based Hierarchical Tracheal Anatomy Understanding from Sparse Surgical Demonstration Annotations for Ultrasound Robots," *(Accepted by International Conference on Cyborg and Bionic Systems (**ICCBS**) 2026)*, 2026.
- W. Yue, R. Zhang, K. Sun, **H. C. Cheung**, R. Zhao, Y. Zhang, C. Xu, W. Yuan, H. Ren "Bio-inspired Self-Oscillating Needle Transducer with Unified In-Keyhole Sensing and Actuation Capability," *(Accepted by IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**) 2026)*, 2026.
- Y. Zhang, W. Yue, **H. C. Cheung**, H. Meng, X. Yang, S. Fu, J. Su, H. Gao, C. Chen, X. Zuo, H. Ren "Bilateral Soft Pouch Matrix Actuation for Multimodal Intraluminal Locomotion of Liquid Sampling Robotics, "***IEEE Transactions on Medical Robotics and Bionics***, 2026, doi: 10.1109/TMRB.2026.3699220.
- D. Yuliarti, R. Prakash, **H. C. Cheung**, A. K. Strong, P. J. Codd, S. Lin, "PalpAid: Multimodal Pneumatic Tactile Sensor for Tissue Palpation," *2026 IEEE 9th International Conference on Soft Robotics (**RoboSoft**)*, Kanazawa, Japan, 2026, pp. 660-665, doi: 10.1109/RoboSoft67810.2026.11522855.
- **H. C. Cheung**, "Design and control of a soft aerial vehicle for conducting aerial grasping," *The Hong Kong Polytechnic University*, 2025. (**MPhil Thesis**)
- **H. C. Cheung**, B. Jiang, Y. Hu, H. K. Chu, C.-Y. Wen, and C.-W. Chang, "Aerial grasping with soft aerial vehicle using disturbance observer-based model predictive control," ***arXiv preprint*** *arXiv:2409.14115*, 2024.
- **H. C. Cheung**, C.-W. Chang, B. Jiang, C.-Y. Wen, and H. K. Chu, "A modular pneumatic soft gripper design for aerial grasping and landing," *2024 IEEE 7th International Conference on Soft Robotics (**RoboSoft**)*, San Diego, CA, USA, 2024, pp. 82-88, doi: 10.1109/RoboSoft60065.2024.10521918.
- C.-W. Chang, L.-Y. Lo, **H. C. Cheung**, Y. Feng, A.-S. Yang, C.-Y. Wen, and W. Zhou, "Proactive guidance for accurate uav landing on a dynamic platform: A visual–inertial approach," ***Sensors***, vol. 22, no. 1, p. 404, 2022.

Awards and Scholarship

- **HKSAR Government Scholarship Fund - Endeavour Merit Award** *2018/19 - 2023/24*

- **The Hong Kong Jockey Club Scholarships –Undergraduate Scholarship**
  - The Hong Kong Jockey Club *2019/20 - 2021/22*

- **BEA Inspiring Student Scholarship**
  -Bank of East Asia *2019/20*

- **Best Engineering Design Award** The Robocon 2019 Hong Kong Contest
  - Hong Kong Science and Technology Parks Corporation *2019*
- **HKSAR Government Scholarship Fund - Talent Development Scholarship** *2018/19 -2019/20*
- **Hong Kong Top 10 Outstanding Teens Award** Hong Kong Outstanding Teens Election
  - Hong Kong Playground Association and The Outstanding Young Persons' Association *2016*

Work Experience

- **The Chinese University of Hong Kong** *Sep 2025 - Aug 2026*

Junior Research Assistant (Full-time) | Supervisor: Prof. Hongliang REN Department of Electronic Engineering

  - Affiliated with the Lab for Medical Robotics, Embodied AI, Navigation in vivo, Intelligent Medical Mechatronics (REN Lab)
  - Designed pneumatic systems and tactile sensing modules for the palpation project
  - Developed learning-based hierarchical tracheal anatomy understanding from sparse surgical demonstration annotations for ultrasound Robots

- **The Hong Kong Polytechnic University** *Jan 2025 - Aug 2025*

Research Administrative Assistant (Full-time) | Supervisor: Prof. Chih-yung WEN AIRO Laboratory

  - Associating with the project "Research Centre for Low Altitude Economy" (4-CE0Q)
  - Assisting with a book ("New Space: From Low Earth Orbit to the Moon and Beyond") that is to be published, addressing tasks such as formatting the citations and reference lists, modifying the diagrams

- **The Hong Kong Polytechnic University** *May 2023 - Aug 2024*

Project Technical Assistant (Part-time) | Supervisor: Prof. Chih-yung WEN AIRO Laboratory

  - Had associated with the research project "Research Centre for Unmanned Autonomous Systems" (P0046487)
  - Provided technical support for 3D printing and mechatronics design

- **Hong Kong Center for Construction Robotics** *Jan 2023 - Jun 2023*

Research Assistant (Part-time) | Supervisor: Dr Ching-Wei Chang

  - Provided technical support for 3D printing
  - Designed the mechanical structure of products and drew the 3D CAD drawings

- **The Hong Kong Polytechnic University** *Sep 2022 - May 2023*

Project Assistant (Part-time) | Supervisor: Prof. Chih-yung WEN AIRO Laboratory

  - Had associated with the research project "Research Centre for Unmanned Autonomous Systems" (P0046487)
  - Provided technical support for 3D printing and composite manufacturing (Carbon fiber airframes)

- **Hong Kong Center for Construction Robotics** *Jun 2022 - Aug 2022*

Student Helper (Full-time) | Supervisor: Dr Ching-Wei Chang

  - Joined one of the existing start-up teams, which is focusing on construction robots
  - Designed the mechanical structure of products and drew the 3D CAD drawings

- **The Hong Kong Polytechnic University** *Aug 2021 - May 2022*

Student Assistant (Part-time) | Supervisor: Prof. Chih-yung WEN AIRO Laboratory

  - Had associated with the research project "Trial: Development of Vertical Take-Off and Landing (VTOL) Unmanned Aerial Vehicle (UAV) for Air Quality Monitoring in Greater Bay Area" (K-ZPJU)
  - Provided technical support for 3D printing
  - Designed the mechanical structure of a movable landing platform for UAVs and controlled its movement with Arduino programming

- **The Hong Kong Polytechnic University** *Dec 2020 - Jul 2021*

Student Assistant (Part-time and Full-time) | Supervisor: Dr Henry Kar Hang CHU Biomimetic Robotics Laboratory

  - Automated pick-and-place task with object recognition using deep learning
  - Applied vision-based control for a robot arm (UR5) and conducted system calibration to ensure precise control

– Incorporated deep learning techniques, specifically Convolutional Neural Networks (CNN), for grasping random objects

• **Carmel Divine Grace Foundation Secondary School** *Sep 2018 - Jun 2020*

Robotics Team Coach (Part-time) Hong Kong

– Led students to win in the International Robotic Olympiad 2019
– Taught students how to use CAD (Computer Aided Drawing) (2D: CorelDRAW and 3D: SolidWorks)
– Taught students how to build robots with DC gear motors, servo motors, and micro-controllers

Volunteer Services and Extra-curricular Activities

• **Judge and Organizer,** Hong Kong Robotics Club *Apr 2018 - now*

– Demonstrating judgment in the Hong Kong Robotic Olympiad and International Robotic Olympiad (https://robotorghk.weebly.com/)
– Tutoring in InnoTech Workshops in InnoCarnival (2013 to 2025)
– Contributing to the game rules modification, preparation of the competitions, and event follow-ups

•**Wooden Boat Crafting Skills - Intern,** The Warehouse Teenage Club *Jun 2024 - Jun 2025*

– Intangible Cultural Heritage Documentation and Promotion Project
– Engaged in learning and participating in the process of wooden boat crafting to ensure compliance with relevant safety standards and requirements.
– Involved in documenting the craft of wooden boat making, meticulously recording the production process and various details.

• **Internal Vice President,** Outstanding Teens Association (Hong Kong) *Oct 2020 - Aug 2024*

– Contacted and promoting events to OTA members
– Handled Financial management
– Coordinated internal administration and organized external voluntary services (e.g., University Simulations in 2021 (https://skmdonaldshek.wixsite.com/hkotausims2021) and 2022 (https://skmdonaldshek.wixsite.com/hkotausims2022)

• **Team member,** HKPolyU Unmanned Aerial Vehicles Team *Sep 2019 - Aug 2022*

– Had been prepared for UAV Challenge –Medical Rescue:
  - A mechanical structure was designed to release a ground vehicle from a fixed-wing VTOL
  - Developed a geofence system design for the fixed-wing VTOL
– Built a fixed-wing VTOL (vertical take-off and landing) unmanned aerial vehicle with postgraduate teammates (Mini Talon: https://youtu.be/ELSqvWizsCc, start from 00:57-01:50)

• **Vice President (Executive),** Outstanding Teens Association (Hong Kong) *Aug 2018 - Sep 2020*

– Led the team of the Academic and Development Committee to plan and organize a Peer to Peer Programme (P2P X STEM) for all students in primary schools and secondary schools in Hong Kong
– Contacting with other student leaders and teachers to promote P2P X STEM
– Sharing personal experience on STEM (robotics) in P2P X STEM

• **Leader of the Team, Crimson,** HKPolyU FENG Robotics Club *Oct 2018 - Oct 2019*

– Chief designer of Manual Robot 1 (A multi-tasking robot with several types of actuators)
– Designer of the rack of compressed air tank for pneumatic cylinders
– Won Best Engineering Award in the Robocon 2019 Hong Kong Contest

Technical Skills and Interests

Languages: English, Cantonese, Mandarin

CAD & CFD: AutoCAD, CorelDRAW, Fusion 360, SOLIDWORKS, TinkerCAD, Ansys Fluent

Programming language libraries & Frameworks: Arduino, C++, Python, ROS, OpenCV, ArduPilot, PX4, TensorFlow, micro:bit, MIT App Inventor, LEGO EV3, Tello TT

Media

- **Interview Video, Student Affairs Office @ PolyU** *Jun 2022*

  SEN Students' Sharing

  – A Big Fan of Robotics
  [https://www.polyu.edu.hk/sao/student-resources-and-support-section/special-needs-support/students-sharing/athena_a-big-fan-of-robotics/]
  [https://youtu.be/Oj3ewcWgY5c?si=zkdg8hLiU-TVvl3f]