

Peter Zheng

☎ (UK) +447894355023 • ✉ zhengp@live.co.uk
<https://www.linkedin.com/in/peter-zheng-a7860382/>

Education.....

PhD in Aerial Robotics, Imperial College London

Oct 2017 – Nov 2022

Micro Integrated Quadrotor Robots for Forest Applications

Fully-funded scholarship, 6 publications in Nature Scientific Reports, RA-L/IROS, RoboSoft etc.

MEng in Aeronautical Engineering, Imperial College London

Oct 2013 – June 2017

First class honors, 3rd year aerial construction group project received the Best Innovation Prize from industry panel

Employment History.....

Graduate Teaching Assistant, Imperial College London

Sept 2018–March 2019

Supervised 30-student teams on creating a TOF obstacle avoidance system, taught multicopter PID control

Engineering Intern, SkyCity Robotics Ltd, UK

July 2016 – July 2017

Lead two colleagues in designing the mechatronics of a tethered window cleaning robotic demonstrator for a start-up

Commercial Research Projects.....

Modular tree climbing robot (Ongoing)

- o Design and manufacture modular multi-DOF articulated tracked robot to climb and access tree canopies
- o Developed algorithm (C++) for I2C slave-master identification when combining multiple modules
- o Designed custom PCB (Fusion 360) for embedded electronics, motor drivers, and SMD components
- o Novel suspension and revised PCB improved ground clearance by 100% while reducing the robot's size by 20%

Academic Research Projects.....

Supervised learning with drone sounds and flight odometry for obstacle detection (Ongoing)

- o Develop deep learning models (PyTorch) to predict noise intensity from drone commands with onboard microphone
- o Studied analytical models to inform drone design and maximize signal-to-noise ratio
- o Achieved 99% prediction accuracy in sound intensity using proprietary neural network architecture

Tilting rotating measuring ring quadcopter (Ongoing)

- o Designed and built a multi-body drone that measures tree diameter using its tilting protective ring
- o Modeled the drone with real-life constraints (Python) to optimize flight controller placement
- o Proposed algorithm to simplify multi-variate design trade-off problems by finding universal trends, reducing a 10-dimensional study to 3-dimensional

Integrated metamorphic quadcopter structure with tendon-driven actuation for perching

- o Designed articulated drone arms (Creo) capable of sustaining in-flight loads and deforming to perch on trees.
- o Developed cable drive gear system with 3D printed metal components
- o Analytical and numerical modeling (MATLAB) of the morphing arm dynamics for parametric studies.
- o Converted 3D plastic printing manufacturing processes to laser cut and pressed composite sandwich, increasing component production yield by 80%, reducing manual manufacturing time by 50%, and increased part performance.
- o Designed state machine to autonomously detect contact with tree branches and perch.

Synchronised multi-axial tilting rotor quadcopter

- o Develop the mechatronics and gimbal mechanism to synchronously tilt four rotors in both roll and pitch axis
- o Developed the control allocator algorithm to enable thrust differential compensation at hardware tilt limit

Offboard radio controlled autonomous flight system using motion capture

- o Developed an offboard autonomous flight system (ROS) that outputs the command to the robot via RC radio.
- o Adapted open-sourced MPC packages for aggressive trajectory flight
- o The system mitigated the cost of integrating flight computers. Used on 5 published works with aerial robots weighing from sub-100g to 2kg.

Skills and Interests.....

Languages: English (Native), Mandarin (Native), Cantonese (Native)

Technical Skills:

Adobe CC apps, C++, Creo Parametric/Simulate, Fusion 360, G-code (Marlin 2/RepRap)
Linux, MATLAB/Simulink, Python, PyTorch, ROS, Solidworks

Hobbies: Basketball, badminton, tennis, music production, board games, reading