

# Tianhou Wang

MEng, MA (Cantab), AMIMechE

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## Research Experience and Education

10/2020 – Present      **Whittle Laboratory, University of Cambridge**, PhD MRes Future Propulsion and Power  
Harding Distinguished Postgraduate Scholar (fully funded)

- This PhD project developed a novel method and a test vehicle to perform high-speed aero engine compressor testing at less than 1% of the time and financial cost of typical industrial tests.
- Harnessing a combination of mechanical, electronic, control, and programming expertise not elsewhere found, I can manufacture and test a single stage transonic geometry in a matter of weeks and measure off-design performance and stall margin better than any computational method available.
- This enables, for a first time in history, transonic experimental testing to inform early design iterations and assist fleet support and is the key to accelerating technology development.

10/2016 – 06/2020      **Christ's College, University of Cambridge**, MEng Engineering Tripos  
Top of the year 2017 – 2019 (no exam in 2020 due to COVID-19)  
IMechE Frederic Barnes Waldron Best Student Award 2020  
Winifred Georgina Holgate-Pollard Memorial Prize 2019, 2017  
The Rex Moir Prize 2018

- The MEng project experimentally investigated the reverse thrust performance of variable-pitch fan aero engines which operates at extreme off-design conditions and CFD cannot be relied on.
- Developed a low-speed rotating rig to measure the aggregate performance as well as the flow features within such an engine. This new test vehicle is fully validated and remains in service today, being used for master's and PhD projects. Results are due to be published in ASME Turbo Expo 2024.

09/2015 – 06/2016      **The University of Hong Kong**, BEng Engineering degree (transferred to Cambridge)  
First class honour (GPA 4.11/4.3)

## Industrial Experience

06/2019 – 09/2019      **Research engineer, Department of Advanced Engineering**  
Cummins Turbo Technologies, Huddersfield, UK

- Trusted by the management to independently lead three research projects on experimental rig design, aerothermal performance simulation algorithm, and material characterisation.
- Delivered results as drawings, BOMs, formulae and calibration constants, detailed written reports, and presentation slide packs. Ensured that work is fully understandable and reproduceable after I finished.
- Output is now being implemented by multiple customer-focused projects.

## Research and Engineering Skills

All-round accomplished competency in an experimental research environment in aerodynamics, turbomachinery, and mechanical engineering, five experimental rigs built from scratch to date.

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- **Mechanical design:** from concept to production drawings and/or product, fully within the cost, time, and manufacturing constraints in an academic environment.
  - Experience with CREO, Solidworks, AutoDesk, and similar commercial software.
  - Hand calculation and drawing for urgent requirements in the field.
  - Experience spans from the mm scale such as probes, pneumatic manifolds, and corona charging cages, to full stationary and rotating rigs, to large scale transonic wind tunnel pipework aerodynamic, structural, and thermal design.
  - Experience in designing for machining (5-axis CNC and manual) and additive manufacturing (SLA, SLS, FFF), experienced machinist and 3D printing operator.
- **Custom electronics:** design and prototype, from concept to installed product or PCB. Examples include custom sensor amplifier, 10 channel pneumatic valve controller, and 1.5 MW plant safety interlock system.
- **Embedded development:** STM32 and Arduino programming and peripheral hardware development for custom control and data acquisition solutions.
- **Programming:** advanced MATLAB with fluent OOP, conversant with C, C++, FORTRAN, and Python.
  - Real-time applications as well as offline data processing.
  - Examples include safety-critical parallel-executing plant control and data acquisition software with GUI and simultaneous instrumentation interfacing through multiple protocols.
- **Instrumentation:** experienced in producing instrumentation for non-standard test requirements, such as electronic non-contact torque measurement of a fully enclosed spindle at speeds exceeding 24,000 rpm, as well as aerodynamic pressure and temperature probes for sub-scale high-speed testing.
- **Communication and teamwork:** led teams of engineers and technicians to undertake major rebuild of transonic wind tunnel, excellent written, drawn, and oral communication evidenced by conference presentations, publications, and teaching experience.

## Teaching

2021	Demonstrator for postgraduate compressor design course.
2021 – Present	Undergraduate teaching: 3 <sup>rd</sup> year advanced fluid mechanics, 1 <sup>st</sup> and 2 <sup>nd</sup> year materials.
2022 – Present	Coach of the ICAO Flight radiotelephony operator licence, ground school and airborne.

## Responsibilities and Interests

- Whittle Laboratory Student Representative. Lead the establishment of a lab-wide equipment sharing system, now facilitating the circulation of more than 150 instruments across PIs and projects with full tracking and defect reporting, drastically cutting setup cost and time of student projects.
- Cambridge University Gliding Club equipment and safety officer 2020 – 2023. Responsible for aircraft airworthiness compliance, aircraft maintenance, and equipment and parachute maintenance.
- Sailplane, motor glider, and light aircraft pilot, licenced to UK CAA Part-SFCL SPL and Part-FCL PPL, British Gliding Association (BGA) Certified Introductory Flight Pilot with over 40 commercial air tours with paying public members flown to date, BGA radiotelephony licence course coach.

## Publications

09/2022                      *Half-scale transonic compressor rapid testing rig:* DOI 10.1088/1742-6596/2511/1/012007

## Referees

Available upon request.