NWTF
NATIONAL WIND TUNNEL FACILITY

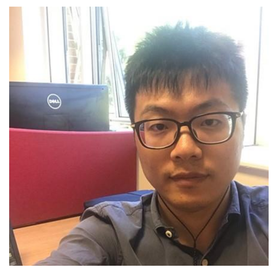
University of BRISTOL

Aeroacoustics Wind tunnel

University of Bristol

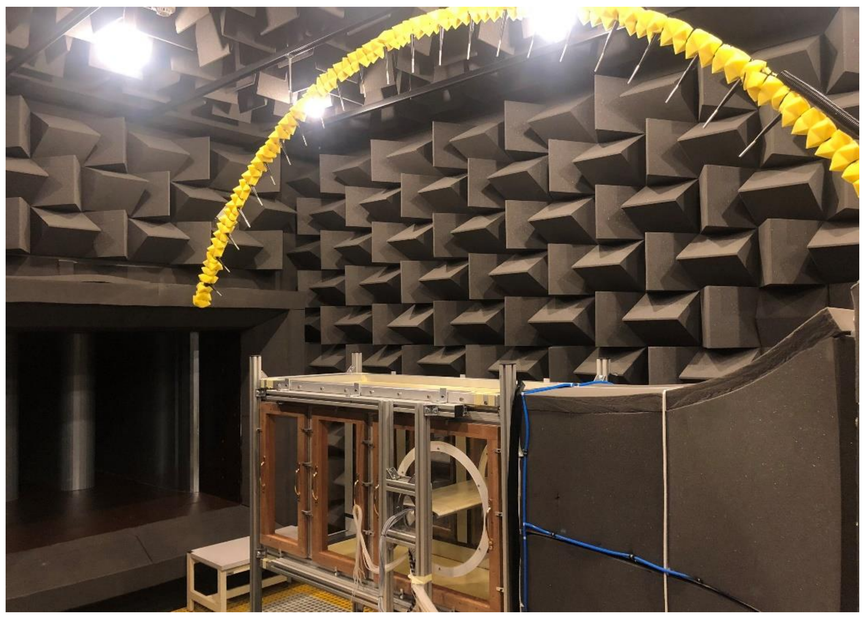
Department of Aerospace Engineering

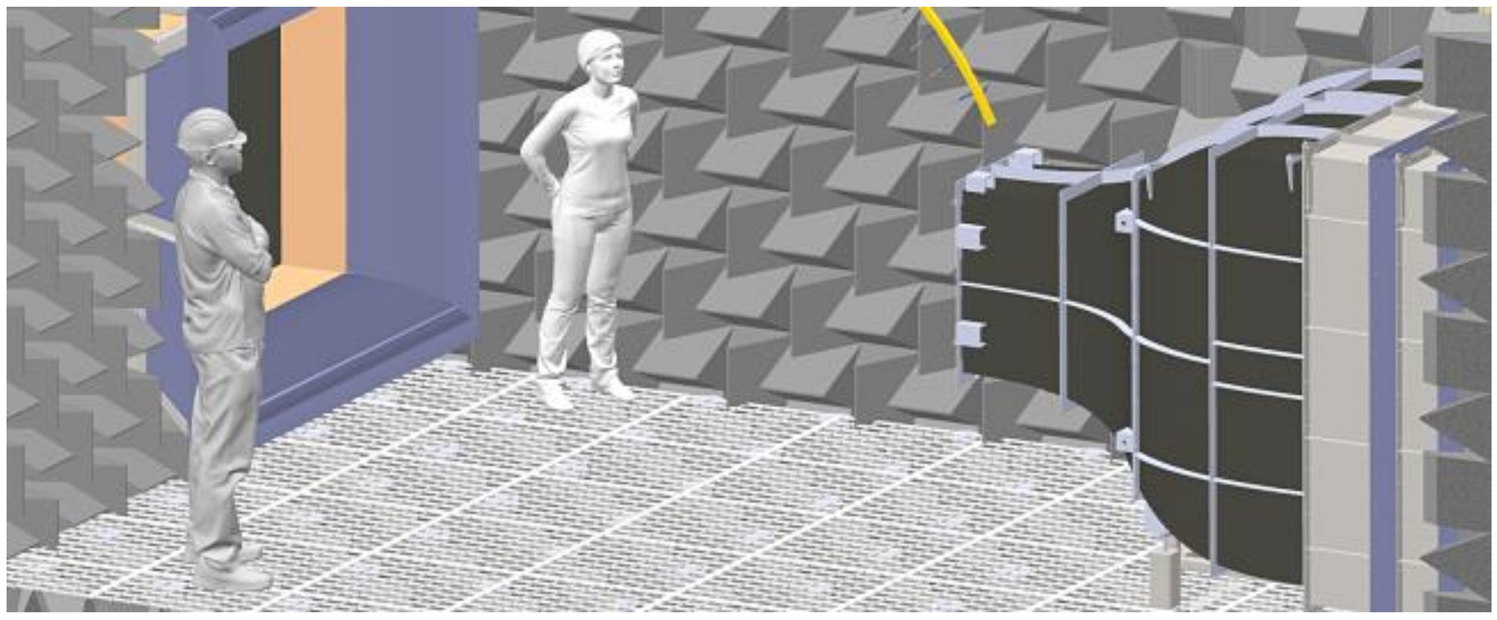
Prof Mahdi Azarpeyvand
m.azarpeyvand@bristol.ac.uk



Dr Nick Zang
nick.zang@bristol.ac.uk

Dr Desmond Lim
desmond.lim@bristol.ac.uk



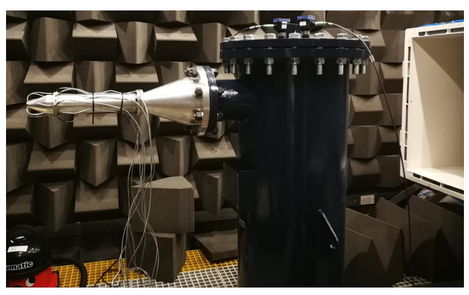


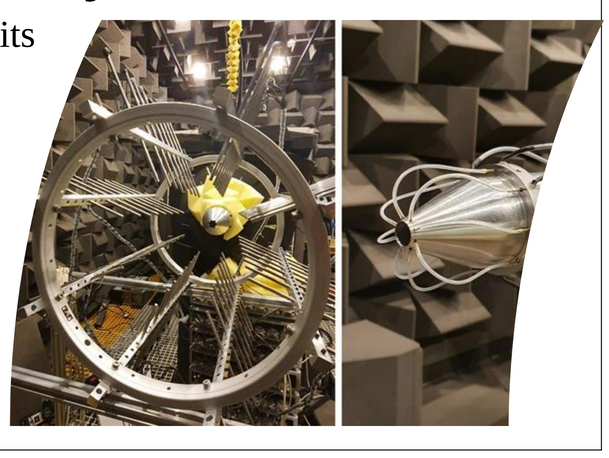
Facility capabilities

- A unique facility nationally, consisting of a very quiet closed-circuit wind tunnel and a **7m × 4.5m × 3.5m anechoic chamber**, fully **anechoic down to 160Hz**
- Powered by a 75kW centrifugal fan and is equipped with a series of large silencers. Equipped with a 40kW water cooled chiller, enabling **continuous testing at 15°C to 30°C** set temperatures (Mayer et al., *Appl. Acoust. 155*, 358-370 (2019))
- Free-stream velocity range from of **8m/s to 120 m/s** with unfiltered free-stream **turbulence intensity of 0.1%** at 30m/s
- High speed jet (subsonic and supersonic)
- **Measurement capabilities** include hotwire and hotfilm CTA system, PIV, in-house unsteady pressure transducers, source localisation beamforming arrays, multiple farfield arcs with GRAS and B&K free-field microphones, NI DAQs for up to 160 channels for simultaneous measurements

High-speed jets

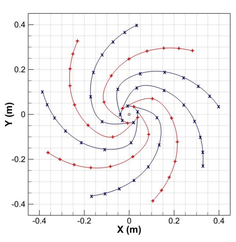
- **JINA:** Jet hydrodynamic field and its interaction with installations

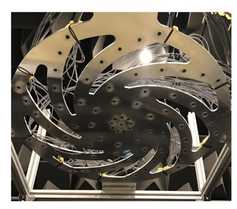




High-lift devices and aerofoils

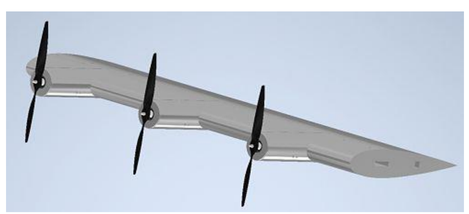
- **Separation and stall:** Airfoil separation and stall noise using acoustically transparent Kevlar-walled test section

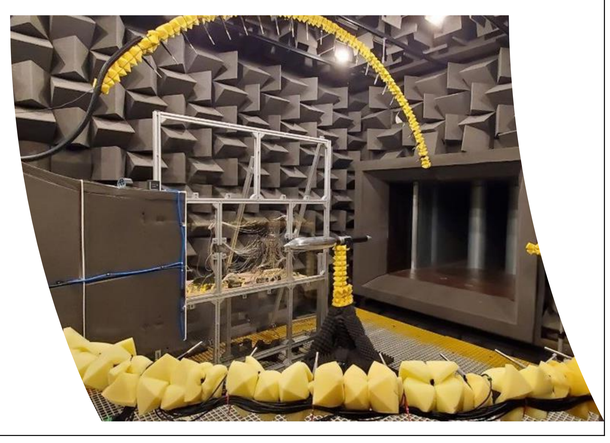




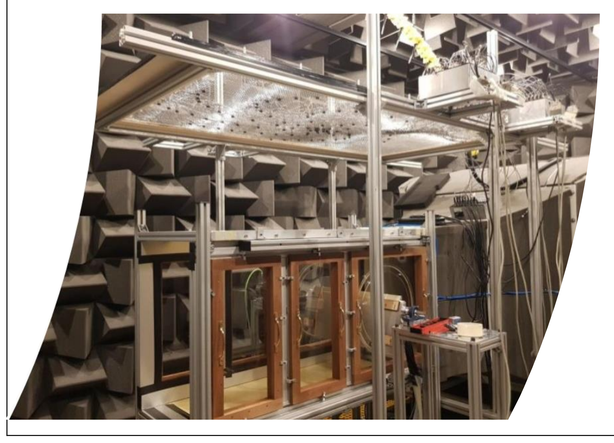
Propeller

- **SilentProp:** Noise associated with distributed electric propulsion configurations





Fundamental turbulence and aeroacoustics



- **ARTEM:** Turbulent boundary layer development across rough and irregular surfaces, trailing edge noise mitigation
- **AERIALIST (H2020):** Acoustic metamaterials to modify noise scattering patterns for turbofan nacelles

Industrial partners and funding agencies

EPSRC

DLR Deutsches Zentrum für Luft- und Raumfahrt German Aerospace Center

VERTICAL

ONERA THE FRENCH AEROSPACE LAB

DOWTY

Horizon2020 European Union Funding for Research & Innovation

Clean Sky 2

AWE

EMBRAER

dyson