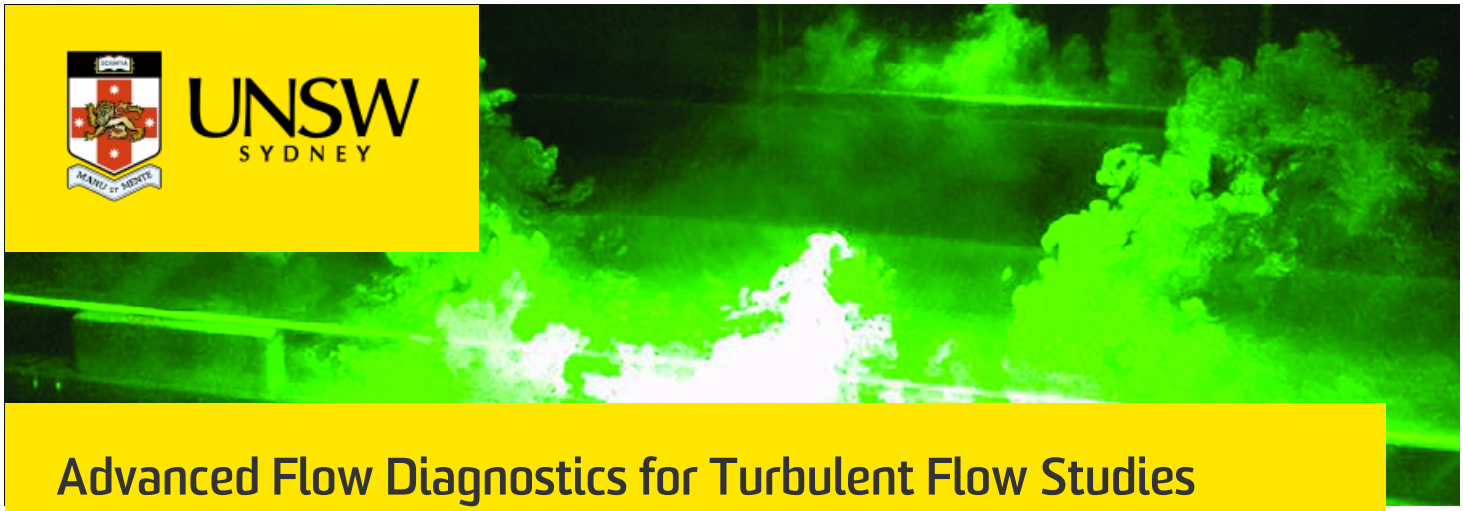

Advanced Flow Diagnostics for Turbulent Flow Studies

The development and application of laser-based flow diagnostics in a variety of environments from microfluidics to large-scale wind-tunnel testing.

Competitive advantage

- Novel flow measurement capability to capture fully-resolved three-dimensional flows using image-based techniques, spanning from micron-resolution measurements for microfluidic devices to large-scale wind-tunnel testing of rapid-prototype models
- Ability to capture aeroacoustics using a state-of-the-art anechoic wind-tunnel facility and to probe supersonic flows in a dedicated supersonic wind-tunnel facility

Impact

- Projects in microfluidics and biofluids have impact through improvements in public health, biotechnology and renewable energy technology. Examples include the design and testing of lab-on-chip devices and 3D flow measurement in patient-specific vascular flows
- High-resolution flow measurements in large-scale wind-tunnel facilities have led to societal benefits such as energy savings and reduced emissions through improved aerodynamic efficiency, better design optimisation and flow modelling capabilities. In particular, the development of measurement diagnostics to directly measure wall-shear stress (drag) over complex geometries from experiments

More Information

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Successful applications

- Developed flow diagnostics, with accuracy beyond current industrial practices, which have been employed to examine turbulent flows in large-scale engineered transport systems (wall-turbulence), urban environments (scaled atmospheric boundary layer conditions) and micron-scaled biofluidic flows

Capabilities and facilities

- Large recirculating wind-tunnel facility for testing at speeds up to 50 m/s with a cross-sectional area of 1.2m x 1m
- Dedicated anechoic wind tunnel facility with simultaneous flow diagnostics
- Supersonic wind-tunnel facility
- Inverted epifluorescent microscopes with laser-based flow diagnostic systems
- Multiple laser-based flow diagnostic lasers and high-speed/high-resolution cameras for wind tunnel testing

Our partners

- Defence Science and Technology (DST) LaVision (Germany)