

Faculty of Engineering

Summer Research Program 2023-2024

Project Title: Supersonic turbine dynamics for advanced aerospace propulsion systems

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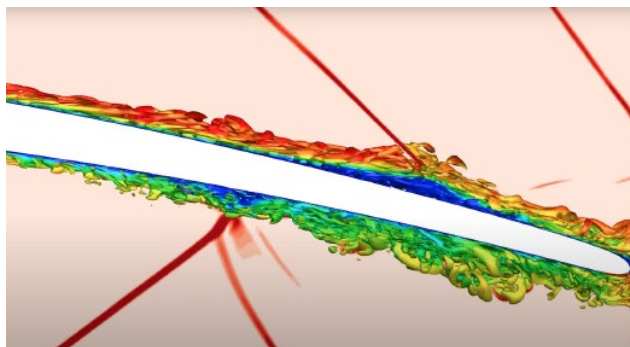
Website profile of project supervisor: Daniel.edgington-mitchell.com

Objective

In this project we will attempt to provide experimental validation of recent findings from high-fidelity numerical simulations performed by our collaborators.

Project Details

The rotating-detonation engine is amongst the most promising next-generation propulsion technologies currently being studied. Though the RDE has the potential to significantly improve the efficiency of both power and thrust generation, there are a number of significant engineering challenges to be overcome to raise them to a higher TRL. Our collaborators have been studying the dynamics of an RDE exhaust interacting with the blades of a turbine. Unlike regular turbines, the inflow condition is supersonic, meaning there are complex shock systems formed when the flow interacts with the blades.



Here we will attempt to visualize this phenomenon in our supersonic wind-tunnel using high-speed schlieren, and perform modal decomposition using Spectral Proper Orthogonal Decomposition.

Prerequisites

Must not be scared of loud noises, as the supersonic tunnel is very noisy.
80+ WAM and an interest in postgraduate study.

Additional Information

Please contact me to discuss before applying for this project.