Faculty of Engineering
Summer Research Program 2021-2022

Project Title: Measuring the topology of liquid-gas interfaces in Rocket Motors

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Objective

Develop an experimental technique for measuring the surface topology of the liquid-gas interface that forms when a liquid fuel is injected along the surface of a rocket motor to shield the surfaces from high temperatures gases through the process of liquid film cooling.

Project Details

The rate at which a liquid film can absorb and transport heat away from the walls of a rocket motor, depends on radiative and convection heat transfer from the hot gases to the liquid and the vaporisation and entrainment of the liquid into the gas flow. This heat and mass transfer are both strongly influenced by the surface area of the liquid-gas interface and the waves that dominate its topology. In this project, principle of schlieren imaging will be used to determine the local thickness of the liquid layer by capturing the refraction of light that occurs as it experience an abrupt change in refractive index when moving from a gas into a liquid.

Prerequisites

Student should have high grades in Fluid Mechanics/Aerodynamics and an interest in both experimental methods and programming.

Additional Information

If shortlisted applicants will be required to attend an interview.