

## Faculty of Engineering

### Summer Research Program 2023-2024

Project Title: Liquid Film Entrainment in Rocket Engines

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### Objective

Develop an experimental technique for measuring the temperature and vapor concentration in the gaseous flow above 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.

### 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 transfer to the liquid-gas interface from the flame depends on the local vapor concentration between the flame and the interface. In this project, principle of schlieren imaging will be used to estimate the temperature and vapor concentration above the interface by capturing the refraction of light that occurs as it moves through regions of differing refractive index.

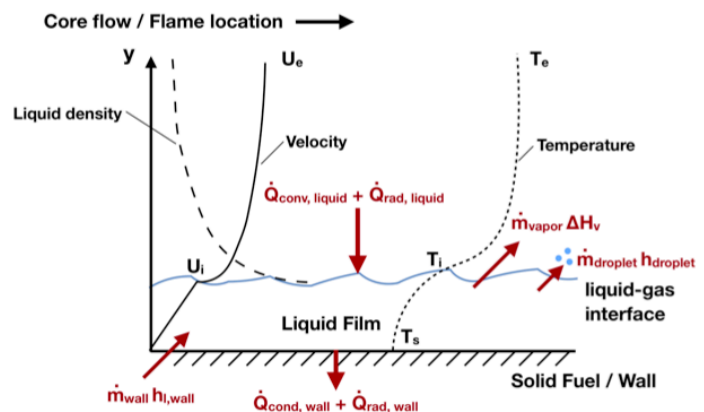


Figure 1: A boundary layer model for hot gaseous flow over a wall-bounded liquid film.

### Prerequisites

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

### Additional Information

If shortlisted applicants will be required to attend an interview.