

## **Two (2) Postdoc Positions on Cryogenic Hydrogen Research: Experiment and Simulation**

The University of Melbourne is seeking two postdoctoral research fellows on liquid hydrogen safety. The project, funded by Fortescue Future Industries, investigates the behavior of liquid hydrogen upon uncontrolled release to the environment during transport and storage. Due to the deep cryogenic state (-253°C), liquid hydrogen can condense all gas components in air. The process involves complex coupling of heat and mass transfer, phase change, and turbulent flow. The coexistence of liquid oxygen and hydrogen presents significant fire hazards.

One of the positions will investigate the cryogenic hydrogen release behaviors by conducting experiments in a flow chamber. Optical diagnostics and complementary tools will be used to study the interaction of the cryogenic fluid and ambient air. The candidate should have a PhD in Mechanical Engineering, Chemical Engineering or equivalent, with strong a background in thermo-fluids and demonstrated experimental skills on related projects. Experience with cryogenics and optical diagnostics is preferred.

The other position will develop computational fluid dynamics simulations of the cryogenic hydrogen plume. The investigation will include multi-dimensional simulation, as well as the development of new equations of state for cryogenic mixtures for use in the simulations, and subsequent validation with experimental results. The role also involves the development of low-order models to guide hydrogen plant design. The candidate should have a PhD in Mechanical Engineering, Chemical Engineering or equivalent, with a strong background in thermo-fluids and demonstrated record of CFD simulation on related topics. Experience with applying equations of state in simulation is preferred.

Salary \$95,179-\$107,547 Australian Dollars + 17% superannuation.

Position duration: 1 year renewable.

Interested applicants to send CV to Adrian Panow [adrian.panow@unimelb.edu.au](mailto:adrian.panow@unimelb.edu.au)

Applications close on 3 December 2021.

### Three (3) PhD Positions on Liquid Hydrogen Safety

The University of Melbourne is seeking three PhD candidates on liquid hydrogen safety. Hydrogen is a clean fuel for decarbonization and is commonly transported as liquid in deep cryogenic state (-253°C). This project, funded by Fortescue Future Industries, investigates safety of liquid hydrogen upon accidental release from the storage containers to the environment. Air can be condensed in the process where heat and mass transfer, phase change, and turbulent flow are intrinsically coupled. The three PhD projects will investigate the cryogenic hydrogen release by respectively:

1. conducting experiments in a flow chamber using optical diagnostics and gas sampling tools,
2. conducting CFD simulations to understand the interactions between the cryogenic fluid and ambient air,
3. developing new equations of state for cryogenic gas mixtures.

All positions require a four-year bachelor degree or a master degree in engineering and a strong background in thermodynamics and fluid mechanics.

PhD stipend top-up available upon application.

Interested applicants to send CV to Adrian Panow [adrian.panow@unimelb.edu.au](mailto:adrian.panow@unimelb.edu.au)

Positions open until filled.