Research Centre for Gas Innovation

Lead institution: University of São Paulo	
Supervisor name: Prof Dr Julio R. Meneghini	**Supervisor department: Mechanical Eng.**
Supervisor email: jmeneg@usp.br	
Co-supervisor: Prof Dr Fabio C. Fonseca	**Co-supervisor department: CCCH/IPEN**
Co-supervisor email: fcfonseca@ipen.br	
Recipient: **TO BE APPOINTED**	**Type: Post-Doctorate**
Project title: Flow field optimization of a PEM fuel cell	
Research theme area: Proton exchange membrane fuel cell / Flow field optimization / Computational fluid dynamics	

Aims

The aim of this post-doctoral position is to train a future leader in flow field optimization of proton exchange membrane fuel cells, with a focus on the application of numerical methods to fuel cell flows. The position will lead development of optimized designs of proton exchange membrane fuel cells.

Objectives

The Research Centre for Gas Innovation (RCGI) at the University of São Paulo aims to undertake research and development into new applications of natural gas as well as synergies between gas and other emerging technologies. In order to fulfil these goals, fuel cells using natural gas have shown great potential. However, some challenges remain that still restrict their widespread use.

This multi-disciplinary post-doctoral position will work within the team of numerical simulation researchers to perform flow field optimization of proton exchange membrane fuel cells (PEMFCs) based on numerical methods, e.g. finite element method. The optimized PEMFC designs will present gains in efficiency that are crucial to further acceptance and use of fuel cells in multiple applications.

The primary objectives and roles of the position are to;

- simulate the flow field of PEMFCs by using multiphysics numerical methods, e.g. finite element methods.
- optimize the flow field of PEMFCs.
- validate numerical simulation results by using experimental models.
- write thorough documentation with the ability to stand up to independent peer review.
- publish methodologies and results in high-impact peer-reviewed journals.
- present research outputs at conferences, meetings, events, and provide input to brief papers and RCGI white papers.
- play a constructive role in the numerical simulation team, providing input to initiatives outside their area of research, and aiding collaboration with external organisations.

This project would be well-suited to a highly quantitative individual with a 1st-class degree and PhD in engineering, science or mathematics. Programming/scripting skills will be beneficial alongside excellent communication. The successful applicant will join a team of leading

multiphysics modellers with opportunities for collaboration worldwide.