

10-203 Donadeo Innovation Centre for Engineering  
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Tel: 780.492.3598  
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[www.mece.engineering.ualberta.ca](http://www.mece.engineering.ualberta.ca)

## **Post-Doctoral Position on SOFC Stack Assembly and Testing**

The solid oxide fuel cell (SOFC) research group at the University of Alberta Faculty of Engineering has an opening for a Postdoctoral Fellow on SOFC stack assembly and testing to start in April 2024. The candidate will work to improve performance and demonstrate the durability of the planar SOFC stack. This will include fuel cell fabrication and testing, stack assembly and post-mortem analysis, and diagnosis of performance-limiting and durability-limiting phenomena. Primary focus points will be on SOFC stack assembly and testing individual cells and the entire stack but the work can expand also on infiltrated catalyst composition and processing, cell architecture optimization, and cell processing. Computational fluid dynamics (CFD) and Machine learning (ML) will be applied to improve the stack design, diagnose the SOFC stack stability issues, and optimize the operational parameters.

### **About the University of Alberta and Edmonton:**

The University of Alberta in Edmonton is one of Canada's top teaching and research universities, with an international reputation for our programs in the humanities, sciences, creative arts, business, engineering, and health sciences. The University of Alberta offers close to 900 undergraduate, graduate, and professional programs in three colleges and 18 faculties on five campuses, including one rural and one francophone campus, and has more than 275,000 alumni worldwide.

The Department of Mechanical Engineering offers high-quality education in one of Canada's largest mechanical engineering departments with world-class research. With a present complement of more than 60 faculty members, research in the Department is vigorous and covers all major areas of mechanical systems and controls, biomechanics, thermo-fluids, mechanics of materials, design and manufacturing, energy systems, and engineering management. Our graduate program attracts students who are dedicated to developing in their area of expertise and presently has an enrollment of over 500 graduate students, including approximately 200 Ph.D. students. The Department of Mechanical Engineering understands that our people are and will continue to be our greatest strength, and we celebrate creativity, diversity, perseverance, and a cooperative spirit.

The University of Alberta is in Edmonton, home to over one million people and Alberta's capital. Edmonton offers a vibrant start-up ecosystem and a major industrial corridor with several partnership opportunities. The city offers the amenities of a large urban center while maintaining a friendly atmosphere. Edmonton is known internationally for its thriving arts scene with a variety of family activities, an array of indoor and outdoor sports and fitness opportunities, one of North America's largest stretches of urban parkland, and top-ranked healthcare services.

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**What You Will Do:**

- Integrate planar SOFCs into 1 kW stacks and perform different tests (EIS, IV, potentiostat etc.).
- Development of the stack components (large planar fuel cells, metal spacers, interconnects, gaskets, end-plates etc.) based on the CFD inputs.
- Varying the operational parameters of the stack and studying their impacts on the performance and stability of the stack.
- Collaborate with the researchers involved in machine learning to optimize the stack performance and stability.
- Review literature and identify opportunities to apply state-of-the-art SOFC research to the stack operation.
- Communicate research results in presentations at meetings and publications in journals.
- Work on meeting milestones and report to project sponsors.

**What Is Required:**

- Ph.D. in materials engineering, chemical engineering, mechanical engineering or a related field focusing on SOFC or SOEC.
- High experience in SOFC stack assembly and testing.
- Excellent hands-on experience in different ceramic fabrication techniques such as slip casting, dip coating, screen printing, tape casting, electrophoretic deposition, and dense and porous structure development.
- Knowledge of drying, sintering and reduction of SOFCs.
- Familiar with different characterization techniques such as XRD, SEM, TEM, Impedance spectroscopy etc.
- Experience with SOFC/SOEC research, electrochemical performance measurement and analysis.
- Ability and willingness to work in a team environment.
- Strong communication skills, both written and oral.
- Ability to produce research deliverables on a scheduled timeline of milestones.
- Self-motivated and able to work independently.
- Ability to learn rapidly and integrate new skills.
- Willingness to take ownership of all experimental tasks of a project.
- Have exceptional organizational, troubleshooting, interpersonal, and leadership skills and the ability to work effectively with a diverse team.

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**Additional Desired Qualifications:**

- Knowledge of the development of anode-supported planar SOFCs is an asset.
- Knowledge of infiltrated catalysts is an asset.
- Knowledge of machine learning, CFD, and their applications in SOFC research is an asset.
- Experience with 3D modeling software and data acquisition software (LabView) is an asset.

**Submission of Job Application:**

This is a 1-year position with the start of April 2024 and the possibility to extend for the second and third year upon availability of the fund. Interested candidates need to email their CV and two sample publications to Dr. Mahdi Shahbakhti ([mahdi@ualberta.ca](mailto:mahdi@ualberta.ca)) and Dr. Amir Hanifi ([hanifi@ualberta.ca](mailto:hanifi@ualberta.ca)). Candidates need to submit their application no later than January 31, 2024. Promising candidates will be interviewed until the position is filled.