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## **Research Assistant Position Available – Design and Modelling of Metal Matrix Composite Systems (Doctoral Student Opportunity)**

### **The Position**

Dr. André McDonald and Dr. James Hogan of the Department of Mechanical Engineering at the University of Alberta, in collaboration with Imperial Oil (Esso), invite applications and queries for a doctoral (PhD) student position in the area of **Design and Modelling of Metal Matrix Composite Coatings and Overlays**. This position will be open to candidates who possess a Master of Science degree in Mechanical Engineering. Applicants with expertise and experience in fracture mechanics, materials science, particulate-reinforced composite materials, or thermal spraying are highly encouraged to apply. The successful candidate will be required to work independently and must communicate well in English. Some national and international travel may be required. The successful candidate will be financially supported. This position is available to Canadian citizens, permanent residents of Canada, and international applicants. It is expected that the successful candidate will take up the position in September 2019. Interested candidates may wish to visit <https://sites.ualberta.ca/~andre2/> to learn more about the Advanced Heat Transfer and Surface Technologies Laboratory and <https://sites.ualberta.ca/~jdhogan/index.html> to learn more about the Centre for Design of Advanced Materials.

### **The Project**

The proposed research project seeks to develop the necessary fundamental understanding of wear failure in carbide-reinforced metal matrix composite coatings and overlays, recognizing the importance of carbide type, crystallographic structure, stoichiometry, size, number, carbide-metal interfacial adhesion, and spacing. After fabrication, testing, and preliminary fracture/wear modelling, it is expected that knowledge obtained will provide substantive guidance to academic and industry partners on how to design single- or multi-metal carbide materials with increased materials performance. The selected candidate will make fundamental contributions to damage modelling, building on previous experimental and modelling work from our groups. There will also be opportunities for thermo-mechanical testing with a new high-speed IR camera and integration of those results into modelling platforms.

### **Training and Professional Development Opportunity**

The training of research assistants and fellows is paramount. The selected candidate will receive formal training in the following practical areas: i) surface preparation, ii) high-quality coating and overlay fabrication, iii) programming and operation of a 20-kg payload robot, iv) operation of an industrial coating deposition system, v) use of high-speed cameras and measurement systems, and vi) safety. The successful candidate will have opportunities to participate in national and international conferences, collaborate with at least one national or international expert on the project, and receive exposure to the expansive professional network of Dr. McDonald and Dr. Hogan.

### **Application Procedure**

Candidates are asked to submit: i) a cover letter; ii) a detailed curriculum vitae highlighting career achievements, areas of research, a list of publications, awards and honours, and a list of three professional references; iii) unofficial transcripts from their undergraduate and graduate programs; and iv) their score sheets from a test of English as a second language, if applicable.

Interested candidates should send their completed application packages and direct queries to **Dr. André McDonald** by email at **andre.mcdonald@ualberta.ca** or to **Dr. James Hogan** by email at **jdhogan@ualberta.ca**.