

# Exploration of Fluid Flow, Heat Transfer, and Electromagnetic Phenomena in Molten Metal in Welding

## PROJECT DESCRIPTION

"This project will involve setting up an existing metal transfer experiment and performing high-speed video analysis, high-speed data acquisition of the process, and materials characterization. Equipment will include a Phantom V210 high-speed video camera (maximum of 300,000 fps), a Miro eX4 (maximum of 110,000 fps), various Omega and NI DAQ systems, with in-lab access to all arc-welding processes. Examples of high-speed video produced and equipment available can be seen at [www.ccwj.ca](http://www.ccwj.ca). A new thermal camera capable of thermal imaging at high frame rate will also be available.

Students must be familiar with the fundamentals of fluid mechanics and heat transfer, mass, and energy balances. Students must also be proficient in a laboratory experiment, respectful of safety guidelines. Students must be familiar and skilled with basic hardware tools. Student has to have basic proficiency with handling and connecting electronics. Familiarity with computers and software is essential. Student must be able to write basic scripts or code for experiments. Matlab, Python, or LabView will be especially strong assets.

Students will set-up experimental system with mentorship of faculty and graduate students. They will operate equipment and high-speed video. Student will process and edit video and data acquisition signals."

## FACULTY-DEPARTMENT

Engineering - Chemical and Materials Engineering

## DESIRED FIELD OF (STUDENT) STUDY

Chemical Engineering, Mechanical Engineering, Materials Engineering, Mathematics, Physics, Computer Science or Engineering. Other fields welcome

## INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

## NUMBER OF INTERNSHIP POSITIONS

1

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)  
University of Alberta International  
[intern@ualberta.ca](mailto:intern@ualberta.ca)

**INTERNSHIP START DATE**

July 4

**INTERNSHIP END DATE**

3 months after start date

**ARE THE DATES FLEXIBLE?**

Yes, I am flexible regarding the internship dates. Selected students can contact me to request a date change.