

Welding Process for Unweldable Aerospace Alloys

PROJECT DESCRIPTION

"The ultimate goal of this project is to understand one of the newest welding processes, currently used to weld rocket bodies, airplanes, high-speed trains, and ships. The process in question is called Friction Stir Welding (FSW).

Despite its relevance to aerospace and other latest-generation manufacturing industries, FSW currently cannot be treated with engineering tools such as formulae or tabulated data.

This project will focus on modeling the coupled heat transfer and plastic deformation in the metal being welded, with a focus on providing a general quantitative set of formulas and tabulated data useful both in research and industry. Such work will generalize current data that is currently unconnected and of little use in industry or research.

In this project students will learn the theory behind FSW, and become familiar with foundational and current literature. Students will also have direct access to our FSW machine, data acquisition systems, and metallographic analysis equipment.

A very high impact is expected from this work, as it will consider the process in a general way, amenable to industrial implementation in the form of simple formulae for the engineers, and tables and graphs for the practitioners.

Required skills for this project include having passed an introduction to heat transfer, introduction to mechanics of materials (strength of materials or solid mechanics), basic use of Microsoft Excel, manual dexterity, self-motivation, natural curiosity, patience, and ability to act on feedback from the supervisor.

Desirable skills for this project include the ability to write code (e.g. Matlab), previous experience on heat transfer or solid mechanics, or previous experience on metallography techniques (cut, mount, polish, optical microscopy)."

FACULTY-DEPARTMENT

Engineering- Chemical and Material Engineering

DESIRED FIELD OF (STUDENT) STUDY

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

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

INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

NUMBER OF INTERNSHIP POSITIONS

1

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.