

# Design of Reconfigurable Hybrid Machine Components (for 3D Printing & CNC Machining)

## PROJECT DESCRIPTION

"Hybrid Manufacturing (HM) is a term used to combine additive (3D printing) and subtractive (machining) processes in a single CNC machine. The proposed research projects will advance the novel hybrid manufacturing that will be used for re-manufacturing of expensive parts and complex parts production with less production time, while using integrated milling and 3D printing technologies on the same machine. The internship projects would supplement other on-going research projects in laboratory, at the University of Alberta. The idea behind the project is the design, development and automation of standardized reconfigurable hybrid machine components such as 3D Printing nozzles, multi-axis and controls.

Project 1: Designing an innovative multi-nozzle Fused-Deposition Modeling (FDM) 3D printing head assembly with enhanced deposition process. This internship will derive a compatible head with multi-nozzle system to increase production.

Project 2: Designing a measurement system for hybrid machine. This includes the sensor design and implementation.

Project 3: 2D image analysis to detect and identify the different kinds of damages a mechanical part and developing an intelligent algorithm for propose its remanufacturing strategies. Matlab or C++ programming tool will be used for algorithm development.

Project 4: Design of systems for industry 4.0, this includes the design of plug-and-play stations for hybrid manufacturing.

## FACULTY-DEPARTMENT

Engineering-Mechanical

## DESIRED FIELD OF (STUDENT) STUDY

Bachelor of Science (or Engineering) degree in Mechanical/ Industrial/ Mechatronics/ aeronautical/ manufacturing/ design/ Computer Science

## INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

Contact: Brendan Cavanagh, Internship Coordinator (Inbound)  
University of Alberta International  
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NUMBER OF INTERNSHIP POSITIONS

4

INTERNSHIP START DATE

July 4

INTERNSHIP END DATE

October 3

ARE THE DATES FLEXIBLE?

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