Additive Manufacturing with Continuous Fiber Reinforcement for Fused Deposition Modelling Process

PROJECT DESCRIPTION

"Composites materials are formed by combining two or more different materials to form a superior material. Fiber reinforced polymers (FRP) are composites in which fibers are used as reinforcements that carry loads and polymers are used as binders to hold fibers together. The nature of fibers determine the strength of the composite. They are added to the thermoplastic polymers as short, long and continuous reinforcements. However, continuous reinforcements are proven to provide higher strength than compared to short and long. One of the two objectives of this research work involves to make a filament using extrusion process such that the final extruded filament has continuous carbon fiber coated with a thermoplastic polymer. The other objective of this research work is to modify the existing FDM 3d printer such that they can print continuous carbon fiber. The problem with using a continuous fiber is that the filament should be sheared off whenever the print head stops depositing the material and moves to a different position. This problem can be addressed by including a shear mechanism as a part of the print head such that the filament is sheared just before the print head moves to a different position.

Skills/background:

The student should have mechatronics/electronics background with a knowledge of working with micro controllers. The student should be comfortable to work with Arduino. It is also necessary that the student has knowledge about the working of 3d printers. Knowledge of solid modeling would be an extra asset.

Expected Role of the student:

Working closing with the supervisor, the student will assist in micro controller programming, hardware interfacing of mechatronic components and mechanical design of the system. The student will be provided necessary tools and software to carry out the assigned tasks. The student will also assist in experimental runs and trial of the system.

FACULTY-DEPARTMENT

Engineering - Mechanical

DESIRED FIELD OF (STUDENT) STUDY

Mechanical Engineering, Mechatronics Engineering, Industrial Engineering

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INTERNSHIP LOCATION

University of Alberta Main Campus - Edmonton

NUMBER OF INTERNSHIP POSITIONS

2

INTERNSHIP START DATE

July 4, 2018

INTERNSHIP END DATE

3 months after start date

ARE THE DATES FLEXIBLE?

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