Design and Fabrication of a Programmable Spray-Traverse System for Fabric Coating

The DREAM Laboratory in the Department of Mechanical & Industrial Engineering at the University of Toronto develops liquid-repellent coatings for fabric and textile applications. One of the laboratory coating methods uses a spray gun mounted on a linear rail, allowing the spray position and distance from the fabric to be controlled.

The goal of this project is to upgrade the existing setup by designing and building a compact automated spray-traverse system. The system will move a spray gun across fabric samples at a controlled and repeatable speed and allow users to adjust parameters such as traverse speed, travel distance, and number of coating passes. The project may also explore a simple method for coordinating spray ON/OFF with the movement of the gun to provide greater control over the coating process.
The student will work with the existing laboratory setup and gain hands-on experience with mechanical design, motor selection and control, basic electronics, and system integration.

Relevant interests/skills: Mechanical design, mechatronics, automation, motor control, prototyping, and manufacturing