4. Programming and controlling a large microfluidic valve array -- Dr. Lesley Shannon

**Background:** Drs. Gray and Shannon have been working on a research collaboration in using microfluidics array for parallel processing of biomolecular samples. We require a student to help design a prototype of a software user interface for obtaining user input and programming the array that will allow the user to manipulate the samples.

**Objective:** The goal of the project is for the student to create the software that will obtain the user inputs and configure the valve array. The student will create a processor-based, System-on-Chip design to control the array on an FPGA that will interface with the control circuitry that manipulates the valves and controls the samples.

**Skills needed:**
- Strong High-level language programming skills (preferably C or C++);
- Strong Critical thinking skills required and an ability to work independently
- Competency in either VHDL, Verilog, or SystemVerilog HDL;
- Competency with FPGAs and their CAD tools (either Xilinx or Altera- however Xilinx is preferable);
- Designed a MicroBlaze/NIOS/ARM based SoC on an FPGA would be very helpful, but is not required.
- Comfortable with Agile and Scrum based software development
- The completion of CMPT 225 and/or ENSC 351 is required
- Completed ensc350 by time of start of coop would be an asset.
- Experience with the Linux kernel and/or device driver design might also be an asset, but not required.

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