NSERC USRA Summer Project 1
Development of wearable microfluidic biomedical sensors integrated into clothing
with Dr. Bonnie Gray

Project Description
The project seeks to combine microfluidic and microelectronic functionality on a textile-based flexible substrate format. The Microinstrumentation Lab has developed methods of printing conductive composite polymers and metals on textiles. We have also developed methods of patterning microfluidic channels on textiles using sacrificial paper substrates (see Fig. 1). We combine these technologies to result in various biomedical sensors and other devices (see Fig. 2), including measurements of heart signals (see Fig. 3) and chemical biomarkers, for applications in health monitoring for humans and animals.

Please see the video at: https://www.sfu.ca/sfunews/stories/2017/new-smart-fabrics-can-monitor-your-health.html

Student Contribution
The student would be expected to work closely with Dr. Gray and the lead on the project (Daehan Chung) to help develop new sensors using our lab’s technologies. This may include some combination of design and modelling, circuit and drive/read-out development, or testing of devices depending on student skill set and interest.

Skills Needed:
The student should be in their third year or above with some combination of the following skills:
1. Biomedical stream students will be given preference.
2. Thesis students will be given preference.
3. Prior microfabrication experience, e.g., ENSC 495, or screen-printing/hobby polymer molding experience.
4. Good grades in circuits classes.
5. Enthusiasm to learn new things and combine knowledge from disparate areas. We are looking for “hands on” people who like to tinker and play in the lab.

For your interview, please be prepared to discuss/demonstrate knowledge in one or more of these areas.