Reconfigurable Computing Lab Summer Coop Projects 2018

Extending system infrastructure for Heterogeneous multicore architectures on FPGAs -- Dr. Lesley Shannon

**Background:** Soft-processors are an important part of the FPGA ecosystem. Their potential for offering high levels of configurability enables their use in systems ranging from simple micro controllers to complex many core systems. Additionally, soft-processor systems on FPGAs offer the flexibility to researchers to perform system level computer architecture. Existing soft-processors are often vendor specific or closed source preventing their use on a wide range of FPGAs and limiting the choice available to researchers.

**Objective:** This project will have a student develop and extend system infrastructure for multicore systems based on our existing Taiga soft-processor. They will increase the processor system’s portability across FPGA vendors creating Board Support Packages for different FPGAs expanding the accessibility of the Taiga project to more researchers. This project provides an opportunity to learn about the low level structure of computer systems both at the hardware and software level.

**Skills needed:**
- Programming competency in either VHDL or Verilog HDL (will learn SystemVerilog during coop);
- High-level language programming skills (preferably C or C++);
- Scripting language knowledge (preferably Python and tcl);
- Competency with FPGAs and their CAD tools (either Xilinx or Altera);
- Completed ensc350 (ensc452 would be an asset)
- Designed a MicroBlaze/NIOS/ARM based SoC on an FPGA would be very helpful, but is not required.
- Experience with the Linux kernel and/or device driver design would also be an asset.

Please visit my website for further information on my research interests and course offerings: [http://www.ensc.sfu.ca/~lshannon/](http://www.ensc.sfu.ca/~lshannon/).