ECE5640 **High Performance Computing** **Spring 2014**

Homework 5: Due Friday, February 28

Homework 5 is due on Friday February 28. Please turn in your code electronically on Blackboard. Include the script you used to run your code on the master cluster. Turn in a print out of you analysis of results to Prof. Leeser's mailbox in 440 Dana.

This homework asks you to implement and examine tradeoffs between different implementations of Sobel Edge detection. The source C++ code and input files are provided. This assignment was discussed in lecture on Thursday, Feb 20.

1. Use OpenMP to implement the host C++ code using parallel threads on the host processor.
2. Use CUDA to write your Sobel code. You may invoke your CUDA code from C host code or from Matlab PCT. This choice is up to you. Your CUDA code should use global memory.
3. Time your different implementations. Which one runs fastest? Which was easiest to code? Explain advantages and disadvantages of each. Explain what you would do to run your code more efficiently.
4. (Bonus) Try different sizes of blocks and numbers of thread per block. Describe your choices, reasons for your choices, and how effective they were. What happens if you use more threads versus more blocks? What if you do more work per thread?