**ECE5640** **High Performance Computing** **Spring 2016**

# Homework 1: Due Wednesday, January 27

Homework is due midnight on Blackboard on Wednesday, January 27. If you scan your homework, make sure it is legible!

**Important:** Submit two files. The first should be a pdf named `lastname_firstname_hw#.pdf` containing answers to all questions, including tables, graphs and screenshots of the output. The second should be a zip file named `lastname_firstname_hw#.zip` containing only codes, `readme.txt` and executables named according to the question numbers. For example the code in question 8b should be named `8b.c`.

Numbered problems are exercises from the book: Introduction to High Performance Scientific Computing by Victor Eijkhout. The exercises are embedded in the chapters.

Each problem is worth 10 points unless otherwise noted.

1. 1.1
2. 1.3
3. 1.4
4. 1.7
5. 1.9. Assume a MESI protocol: Modified, Exclusive, Shared, Invalid
6. 1.13 Hint: What values of s allow your data to fit in the cache?
7. 1.14
8. (30 pts)
   (a) On the discovery cluster, run the Euclidean distance code provided *on an interactive node*. Provide a screen shot of your code running.
   (b) Modify this code to use util.h to generate input vectors of arbitrary length. Turn in your code.
   (c) Using batch mode on the discovery cluster, run your Euclidean distance code. Use vectors of length $10^7$, $10^8$, and $10^9$. Time your code. Turn in a table for the different length vectors and run time.
   (d) Run your Euclidean distance code on the discovery cluster with vectors of length $10^7$. Use gprof to analyze your code. Turn in the output generated by gprof.