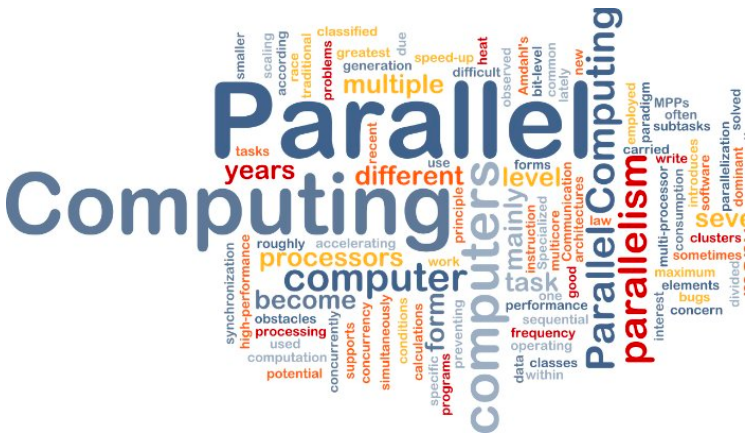

CSCE 569 Parallel Computing, Spring 2018 (CRN:55679)
Department of Computer Science and Engineering

Overview: In high performance computing (HPC) systems and enterprise systems, parallel and distributed computing have been the approaches for several decades to deliver the performance needed for large-scale scientific and engineering simulation, and for big data analysis and machine learning. Today, parallel computing capability are available in the computing devices we use daily. Multicores CPUs are widely used in laptop, desktop, smartpad and phone, and some of them have manycore GPUs. In this course, we will study the processor, memory and interconnection architectures of modern CPU, GPU and HPC clusters, learn to design high performance parallel algorithms, and develop parallel programs using OpenMP, CUDA and MPI programming models. The course content includes ~40% theory and fundamentals, and ~60% programming and exercises.

Learning Objectives:

1. Describe benefits and applications of parallel computing;
2. Explain architectures of multicore CPU, GPUs and HPC clusters, including the key concepts in parallel computer architectures, e.g. shared memory system, distributed system, NUMA and cache coherence, interconnection;
3. Understand principles for parallel and concurrent program design, e.g. decomposition of works, task and data parallelism, processor mapping, mutual exclusion, locks;
4. Write parallel program using OpenMP, CUDA, and MPI programming models;
5. Perform analysis and optimization of parallel program;

Basic Information:

- **Website**: https://passlab.github.io/CSCE569
- **Meeting Time**: 9:40 AM - 10:55AM Monday and Wednesday
- **Class Room**: 2A15, Swearingen Engineer Center, 301 Main St, Columbia, SC 29208
- **Instructor**: Yonghong Yan, http://cse.sc.edu/~yanyh, yanyh@cse.sc.edu
    - Office: Room 2211, Storey Innovation Center (Horizon II), 550 Assembly St, Columbia, SC 29201
    - Tel: 803-777-7361
    - Office Hours: TBD, after class or by appointment