

Methods in Parallel Computing

Course Number: CMSE401 Spring 2019 (4 credits)

Title: Methods Parallel Computing

Time: Monday, Wednesday and Friday - 12:30 - 1:40 PM

Location: [A148 Plant & Soil Science Building](#)

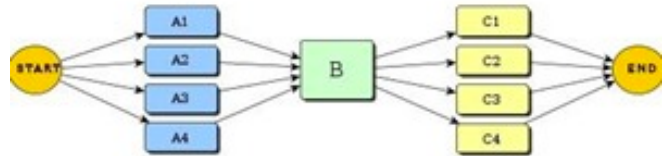
Prerequisite: (CMSE 202 and CSE 232) and (MTH 235 or MTH 340 or MTH 347H)



Instructor: Dirk Colbry

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Office: 1516 Engineering Building



Description: Core principles, techniques, and use of parallel computation using modern supercomputers. Parallel architectures and programming models. Message-passing and threaded programming. Principles of parallel algorithm design. Performance analysis and optimization.

This is an advanced programming course on the tools and techniques for parallel programming with a focus on scientific/engineering applications and solving large problems using computers.

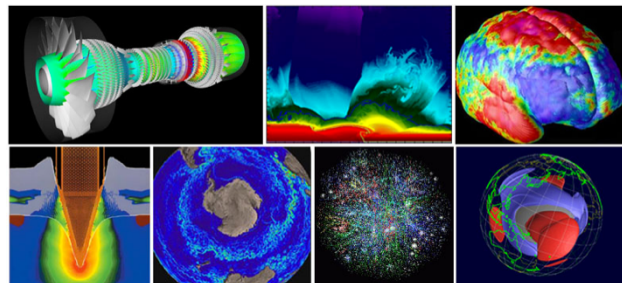
Topics include:

- Parallel architectures
- Memory Management and Code Vectorization
- Pleasantly Parallel workflows (Ex. HTCondor)
- Large Scale Computing (Ex. HPC and iCER)
- Shared Memory Communication (Ex. OpenMP)
- Shared Network Communication (Ex. MPI)
- Accelerators (Ex. Cuda and Open ACC)



Example application areas include:

- Big Data Problems
- Large Matrix Multiplication
- Large Scale Simulations
- Scientific Visualization



Format: This course is taught using a flipped classroom format similar to CMSE 201/202. In a flipped classroom, students watch recorded video lectures outside of class and then work individually and in groups to solve problems during class. Class examples and assignments will use both the Python and C/C++ programming languages. Students are not expected to know but may also see examples in other languages such as FORTRAN, CUDA and Julia.

Questions? Contact the instructor for more information, or to obtain an enrollment override.