

# THE DATA SCIENCE INSTITUTE



## INTRODUCTION TO HIGH PERFORMANCE COMPUTING FOR ENGINEERS AND SCIENTISTS

### ENGI 6397



Mondays and Wednesdays 11:30 AM to 1:00 PM  
Multidisciplinary Research and Engineering  
Building (MREB), 2nd floor, room 200

This graduate level course will provide the foundations to understand the echo system, the tools and the methods utilized in high-performance computing (HPC) systems. The most competitive calculations and simulations are all currently being done in HPC systems. You will learn how to find your way inside a super-computer, and to query all the options available for your research such as memory, cores, nodes, job schedulers. The course will then move onto some programming languages structures, software engineering best practices, code optimization, performance metrics, and utilization of numerical libraries, which are essential to build real-world scientific and engineering applications. A good deal of time will be devoted to the paradigm of harnessing the power of several computer cores simultaneously in the context of practical applications in engineering and science. To this end the parallel computing models and implementations such as MPI, OpenMP, GP-GPU programming will be studied. At the end of the course, some of the most powerful HPC data visualization platforms will also be explored that will enable effective communication of your research. By the end of the course, students will have a very solid understanding about current and emerging technologies for competitive career in computational engineering and sciences.

