Professor: Torgersen
Office Phone: 758-5536
Office Hours: Monday and Wednesday 3:00 to 4:00 and by appointment.
Text: Gregory R. Andrews, Foundations of Multithreaded, Parallel, and Distributed Programming
Facilities: SGI Origin 2000 (kokua), WFU Linux Cluster (deac), WFU Grid, Sun 4600 M2 (inti)

Goals:

1. Overview of Parallel Architecture Designs
   (a) Shared Memory
   (b) Message Passing
   (c) Grid computing
   (d) Vector processors (Historical)

2. Overview of Parallel Computing Paradigms
   (a) Fine grain vs coarse grain parallelism
   (b) Data parallelism vs functional parallelism
   (c) Light weight threads
   (d) Parallel programming directives (SGI Pragmas)
   (e) MPI, PVM
   (f) High performance issues, e.g., cache, profiling.

3. Hands-on
   (a) Parallel programming projects. Cache issues.
   (b) Include problems from a variety of disciplines, e.g., image processing, problems from your thesis research.
   (c) Develop skill in programming with concurrent threads.
   (d) Program correctness: you can’t verify a parallel program by testing!!

4. Some widely-studied parallel problems, e.g. parallel prefix, matrix operations, parallel FFT combinatorial search, simple heat equation,

5. The Holy Grail: Data dependency analysis

6. Automatic detection of parallelism

7. Theory: Parallel time complexity and Correctness proofs (as time allows)

Expectations:

1. Class participation.
2. Communicate if things get complicated.
3. Your best effort.

Grading:
Two exams (50%), a few take home problem sets (10%), as many programming projects as we can produce (40%).

Disability Notice:
If you have a disability that may require an accommodation for taking this course, then please contact the Learning Assistance Center (758-5929) within the first two weeks of the semester.

Pandemic Planning Notice:
The University has requested that faculty collect personal contact information as part of emergency planning and preparation. The information you provide is strictly confidential.