

## Syllabus for CS Workshop: Parallel Computing for Scientists

Instructor: Craig Rasmussen

UO, Fall 2015 quarter

Time to be determined

**Workshop Description:** Principles and practice of parallel computing/architecture. Review of scientific computing principles. Overview of hardware for cluster computing, including a survey of node hardware and high-speed networking hardware/software. Shared and distributed-memory systems. Programming scalable systems and message passing. Modeling of program performance with a focus on speedup, efficiency, and scalability. Troubleshooting and designing/configuring clusters for scientific computing.

### **Skill Goals:**

After successfully completing this workshop a student should be able to:

- Use Unix/Fortran/ACISS for parallel computing.
- Parallelize an existing application using an appropriate parallel programming paradigm.
- Design, implement, test and debug a parallel application.
- Explain the tradeoffs that results for using a specific programming paradigm for a given scientific problem.
- Understand the various components of parallel architecture and effect of architecture on the design/implementation of a parallel algorithm.
- Quantify speedup using empirical tools and theory.

**Prerequisites:** Some basic competence in a programming language.

**Workshop Requirements:** Homework/programming assignments, weekly reading.

**Inquiries:** Craig Rasmussen <rasmus@uoregon.edu>