

George Mason University

College of Science, Bioinformatics: Fall 2006

BINF 739 – 001: 73782

High Performance Computing in Computational Biology

Status:	Active
Available for Registration:	Apr 13, 2006 - Sep 12, 2006
College:	College of Science
Department:	Bioinformatics & Computational Biology
Part of Term:	1
Course Credits:	3.000
Course Levels:	Graduate, Non-Degree, Consortium
Prerequisite:	Permission of the instructor
Additional comments:	May be repeated for credit as needed

Time: Wednesday, 7:20 p.m. – 10:00 p.m.

Place: Prince William: Occoquan Building 302A

Instructor: Alexei Samsonovich <asamsono@gmu.edu>

Office: Prince William: Occoquan Building 308

Office hours: Wednesday, 6:20 p.m. – 7:10 p.m.

Texts: (1) Required:

Quinn, M.J. (2004) Parallel Programming in C with MPI and OpenMP (hardcover).
Boston, MA: McGraw-Hill.

(2) Recommended (available on reserve):

William Gropp (1999) Using MPI-2 : Advanced Features of the Message-Passing Interface. Cambridge, MA: MIT Press.

William Gropp and Marc Snir (1998) MPI - the Complete Reference. Vol. 1, 2.
Cambridge, MA: MIT Press.

Additional materials may be handed by the instructor.

Tentative class schedule (may change over time):

August 30	Chapter 1
September 6	Chapters 2-3
September 13	Chapters 4-5, HW1 assignment
September 20	Chapters 6-7, 8, 11, HW1 due
September 27	Chapters 9-10, 12, 13, HW2 due
October 4	Chapters 14-18, HW3 due
October 11	Projects description, HW4 due
October 18	Projects discussion and assignment
October 25	Projects progress reports
November 1	Projects progress reports
November 8	Projects progress reports
November 15	Projects progress reports
November 22	Projects progress reports
November 29	Thanksgivings
December 6	Projects final presentations
December 13	Projects final presentations, course evaluation

This course will cover the technique of parallel programming in C based on message-passing interface (MPI), including a number of related numerical methods and algorithms. The study will closely follow the textbook (Quinn, 2004) with the focus on practical aspects of knowledge. As a part of this course, students will be asked to complete their own research projects using MPI.

The grading will be based on homeworks (40%) and the successful completion of project assignments (60%). The success criterion, as far as the grade is concerned, is the correct implementation of the model (no bugs in the code) plus the completion of the assigned simulation protocol, regardless of whether the simulation produces publishable results. Writing and submitting a paper based on publishable results is optional and welcome (if necessary, can be counted for extra credit).

Students are supposed to read the relevant textbook chapters before the class. Additional materials, when needed, will be handed by the instructor in advance. Project selection and assignment will be individualized, with a choice limited to several pre-determined tasks in computational biology (understood broadly). Collaboration among students in their work on the projects is acceptable in principle; however, any particular arrangement of a collaborative work on a project needs to be approved by the instructor. In contrast, students are supposed to work on their homework assignments individually (copying is not allowed) and should only use the approved sources of information in this case.