Fifth Annual Iowa High Performance Computing Summer School

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University of Iowa

2523 UCC Training Room
University of Iowa
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Thank you

Ben Rogers	Information Technology Services
Glenn Johnson	Information Technology Services
Mary Grabe	Information Technology Services
Amir Bozorgzadeh	Information Technology Services
Mike Jenn	Information Technology Services
Preston Smith	Purdue University

and

National Science Foundation

Rosen Center for Advanced Computing, Purdue University

Great Lakes Consortium for Petascale Computing

Outline

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- Welcome and Introductions
- Aims of this Summer School
- Comments
- Getting Online

Faculty

The University of Iowa

The IHPC 2013 Summer School is taught by three faculty members

Professor Gregory Howes

Department of Physics and Astronomy
University of Iowa

Professor Daniel Bodony

Department of Aerospace Engineering
University of Illinois, Urbana-Champaign

Professor Erik Schnetter

Perimeter Institute for Theoretical Physics
Waterloo, Canada

Welcome and Introductions

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- Students from four universities
  - Michigan State University
  - University of Illinois, Urbana-Champaign
  - University of Iowa
  - University of Wisconsin, Milwaukee
- Students from a wide range of departments:
  - Aerospace Engineering
  - Animal Science
  - Chemical and Biochemical Engineering
  - Computer Science
  - Electrical and Computer Engineering
  - Geography
  - Mathematics
  - Mechanical Engineering
  - Physics and Astronomy
- Please Introduce yourselves:
  - Name
  - Department and University
  - Academic Status and Year (ex. graduate student, 3rd year)
  - High Performance Computing Experience
  - Research Topic

Aims of this Summer School

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To enable you to apply parallel computing to your own research

General Comments:

- Much of this material may be familiar to you

- We plan to explain things from a very basic level to make sure this group from such diverse backgrounds can follow

Comments

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A few comments before we get started are in order:

1) Terminology: Terminology in this field is *not* standardized.
   - This field is new and evolves rapidly.

2) HPC is valuable to a wide range of fields:
   - Many examples I use will come from the field of physics.
   - I will try to present the specific problems in a relatively abstract way so that you can consider them simply mathematical problems to be solved.

3) Software (programming) vs. Hardware (computers):
   - I am not going to talk a lot about different hardware options, but will focus on the software side, specfically how to design and implement parallel algorithms.

Comments

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4) Common approaches vs. Exhaustive coverage:

-This will not be an exhaustive review of all possible HPC approaches

- I will focus on the most important and widely used approaches

- In particular, we will talk a lot about MPI, OpenMP, and CUDA

5) Specificity vs. Generality:

- I will try to strike a balance between specific examples, which are often most illuminating, vs. general considerations which may apply to a more wide variety of HPC applications

Getting Online

Each participant has accounts set up on several computers:

University of Iowa, Research Services:

- Helium

  359 compute nodes (3508 cores)

  `helium.hpc.uiowa.edu`

- Detailed information for running on Helium is available at

https://www.icts.uiowa.edu/confluence/display/ICTSit/User+Documentation

Rosen Center for Advanced Computing, Purdue University:

- Moffet: SiCortex 5832

  756 compute nodes (4536 cores)

  `moffett.rcac.purdue.edu`

- Detailed information for running on Moffett is available at

http://www.rcac.purdue.edu/userinfo/resources/moffett/newuser.cfm

- See handout for information on getting online and submitting both interactive and batch jobs

IHPC 2013 Course Website

The website with all of the IHPC 2013 Materials can be found at

http://www.physics.uiowa.edu/~ghowes/teach/ihpc13/index.html