Cross-Institution Grid Classroom

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Coastal Carolina In A Nutshell

- Liberal arts institution
- Myrtle Beach, SC
- Around 8,400 students
- 51 degree programs
  - Primarily undergraduate
- Computer science
  - Theory
  - Application
- Information systems
  - Web application development
- Change was on the horizon!
Change in Faculty Makeup

• Several new faculty hired
• Broaden dept. focus areas
  – Computer architecture
  – Parallel computing
    • PGAS
    • Explicit message passing
  – Cloud & HT computing
• Introduction to parallel systems
  – Basics
  – MPI
• No (or few) locally available cluster computing resources
Collaboration With Clemson University

- Opened dialog
- Overwhelming support
- Team-taught
- Prototype grid-classroom
- Spring 2010 CSCI 473
  - Trial run, 100+ core cluster
- Spring 2011 CSCI 473
  - Palmetto supercomputer
- Logistics
  - Classroom scheduling
  - Calendars
Grid Classroom Prototype

- Dedicated classroom
  - Clemson
- Mobile classroom
  - Coastal Carolina
- Video-conferencing
  - IOCOM (Sp’10)
  - EVO (Sp’11)
- Enrollment
  - 8 (CCU) / 15 (CU) (Sp’10)
  - 9 (CCU) / 12 (CU) (Sp’11)
- Added to curriculum (Fa’11)
- Spring 2012 (CCU to lead)
Course Content

- **Lecture**
  - History
  - Architectures
  - MPI & OpenMP
  - Algorithms
  - Performance (Iso)

- **Assignments**
  - Global sum from basics
  - Floyd’s all-pairs (2D)
  - Cannon’s matrix multiply
  - Monte Carlo (NT)

- **LittleFE / CUDA GPU**
Student Feedback

- Programming assignments on cluster
- Multiple perspectives from professors
- Confidence building
- Interest in graduate school
- Challenges
  - Team-teaching
  - Conferencing technology (fixed now!)
  - Network congestion (fixed now!)
  - Jitter & artifacts (fixed now!)
“This collaboration has provided CCU students an opportunity to access a level of technology not previously available to them.”

“We believe that continuing this relationship to its natural conclusion is in our best interest both as a department as well as a university.”

“This course allows our students to be competitive in an area of computer science that is completely under-represented in the department at this time.”
Computational Science at CCU

• College of Science
  – Marine science (regional hypoxia simulation)
  – Physics (climate modeling, gravitational waves)
  – Biology (multi-loci phylogenomic analysis)
  – Mathematics (frames, matrix search)
  – Computer science (PGAS, OrangeFS)

• Computational Science Minor
  – Undergraduate education
  – Engaging undergraduates in research

• Establish Center for Computational Science
  – SC/TN EPSCoR/IDEA 2012 Proposal
Thank You!

Questions?

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