Want Better Research Faster?
How Can CSU Make High-Performance Computing
Work for You?

ISTeC
Research Computing Open Forum

Friday, September 26
1pm - 3pm
Morgan Library Event Hall
(dessert and beverages will be available)
H. J. Siegel
Abell Endowed Chair Distinguished Professor of Electrical and Computer Engineering and Professor of Computer Science

- “Want Better Research Faster?”
- “How Can CSU Make High-Performance Computing (HPC) Work for You?”

**Objective of Open Forum**

- gather feedback so CSU can provide HPC for your research
  - equipment, software packages, education, consulting
- determine an approach for providing these needs
Definition of HPC (High-Performance Computing)

- HPC definition is a loose guideline for our committee’s work
- “Any computer program or software application that
  - requires or would benefit from the use of numerous processors and/or computers to process some volume of data
  - within a reasonable timeframe
  - that would be beyond the capabilities of a single laptop/desktop/workstation computer.”
- also a need on campus for storage that is higher performance and/or larger in scale than is found with a typical desktop
  - there is a separate ISTeC Data Management Committee
  - we will interact with that committee
    - to avoid reinventing what they are doing
    - while being sure that data issues are not ignored
What We Have Today

- ISTeC “won” NSF MRI grant in 2009 for a campus HPC system
- ISTeC Cray operational in January 2011
  - for small to medium-sized applications
- a diverse and steadily growing user base, exceeding capability
- excellent HPC courses and tutorials in the past
- a reliable, but aging, hardware environment
- a rich suite of customized software application packages
- industrial participation (Woodward)
- successful
What are We Lacking Today

• capacity to accommodate
  ▲ growth in users to ~ 1,000 within 2 to 3 years
  ▲ bigger, more complex, large-data applications

• ability to allow users to have large subsystems for a week

• latest hardware technology (including accelerators)
  ▲ > 10X increase in performance

• latest internal processor interconnect technology
  ▲ especially for large, complex, multi-physics problems

• big data, fast storage

• support for continuing to teach courses on how to use HPC

• support for an HPC consulting service

• CSU is now behind other institutions in the state in HPC
  that have significant internal financial support - UCB, Mines
ISTeC Research Computing Committee

- constituted by the Offices of the Vice Presidents for Research and Information Technology (VPR and VPIT)
- received charge from VPIT on April 28, 2014
  - determine a strategy for research computing for CSU
  - consider alternatives for research computing systems, both on-campus and off-campus
  - analyze the range and scope of the research computing being done at CSU that needs HPC
  - if the ISTeC Cray is being used efficiently and effectively
  - try to finish report by end of October 2014
ISTeC Research Computing Committee Members

- H.J. Siegel, Electrical & Computer Eng’g Dept., COE - Chair
- Wim Bohm, Computer Science Dept., CNS
- Randy Boone, Ecosystem Science & Sustain. Dept., WCNR
- Ray Browning, Health and Exercise Science Dept., CAHS
- Richard Casey, Infectious Disease Research Center (IDRC)
- Dan Cooley, Statistics Dept., CNS
- Mark Enns, Animal Sciences Dept., CAS
- Xinfeng Gao, Mechanical Engineering Dept., COE
- Dan Hamp, ACNS
- Bhavesh Khemka, student/Post-Doc rep. and ISTeC Cray user
- Scott Novogoratz, CVMBS
- Tony Rappe, Chemistry Dept., CNS
- Dan Turk, Computer Information Systems Dept., COB
1. ISTeC Research Computing Committee - H.J. Siegel, ECE (5/5)
2. Welcome - Pat Burns, VPIT, and Aaln Rudolph, VPR (5/5)
3. Brief Overview of ISTeC Cray - Rick Casey, ACNS/IDRC (5/5)
4. Purdue CIO HPC Approach - Scott Novogoratz, CVMBS (5/5)
5. Survey of HPC at Other Universities - Pat Burns, VPIT (5/5)
6. Survey of HPC Needs at CSU - Tony Rappe, Chemistry (10/10)
7. Using Cloud Computing - Rick Casey, ACNS/IDRC (5/5)
8. Using NSF or Nat’I Lab Machines - Bhavesh Khemka, ECE (5/5)
10. Additional feedback and discussion (20 minutes)