ISTeC CSU Cray XT6m
High-Performance Computer

• Funding
  – $640K NSF grant
  – 50/50 engineering & life sciences content
  – PI’s: Pat Burns & HJ Siegel

• Specs
  – 2,016 CPU cores
  – 2.5 TB RAM
  – 32 TB disk
  – 19 Teraflops / sec.

• 500+ CSU user accounts + Woodward Governor & Boeing grant
• Many colleges and departments, diverse disciplines
• Publications, grants, conference proceedings
• Software/Databases: ca. 150 apps & DB’s

• Staff
  – ½-FTE manager
  – ¼-FTE sysadmin
  – ½-FTE grad student (occasional)

• Total Cost of Ownership: ca. $200K / yr.
ISTeC Cray Usage by College
Nov. 2013: 495 Total Users

- Engineering: 179
- Nat. Sciences: 161
- CVMBS: 65
- Nat. Resources: 30
- Ag. Sciences: 26
- Woodward: 20
- Health&Human Sci.: 5
# Applications & Databases Installed on Cray

<table>
<thead>
<tr>
<th>Category</th>
<th>Software</th>
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<tbody>
<tr>
<td>“R” statistical package &amp; 50+ “R” modules</td>
<td>MACS, Mercurial, Metacom, MetaVelvet, Migrate, Mira, Mono, Mothur, MUMmer, MySQL, NCBI databases, NCBI-Blast, NETcdf, Numpy, Oases, OpenBUGS, OpenEye Suite, OpenFOAM, OpenMPI, Parallel-NETcdf, Pasha, Pauda, pBWA, PeakSplitter, Plexos, PostGreSQL, PyCogent, Python, Qiime, Ray, RayDenovo, RayMeta, RDP, RepeatMasker, RMblast, RPPR, Samtools, Scipy, Shore, SILVA, Smoldyn, SOAPdenovo, SOLID System de novo Assembly Tools, SortmeRNA, Sprng, Staden, Subversion, Tau, Tophat, Totalview, TrinityRNASEq, UPP, Velvet, VelvetOptimiser, Visit, WGS</td>
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Cray Used in Courses

GRAD511: "High Performance Computing and Visualization"
GRAD510: "Fundamentals of High Performance Computing"
CS475: "Parallel Programming"
CS675: "Advanced Parallel Computing"
CS560: "Foundations of Fine-Grained Parallelism"


Journals: 36
Book chapters: 3
Theses/Dissertations: 2
Conference papers: 45
Other: 2
CSU MIC Cluster

- Launched August 2014
- Internal $25K grant
- 8 CPU cores
- 180 MIC cores – Intel Phi Coprocessor
- 24 GB RAM
- 8 TB disk

- Makes accelerators available to CSU community
Benefits of a Campus Resource – One Alternative

• Research computing hardware
  • Attractor for new faculty
  • Supports advanced education

• Stable hardware & software environment needed for multi-year development efforts
  • HPC is hard and requires sustained effort
  • Foundation for intellectual development

• Data locality for tasks that use “big data”
• We install software apps at user requests, custom for CSU researchers
• Resource easily & quickly available
• Other alternatives will be discussed