

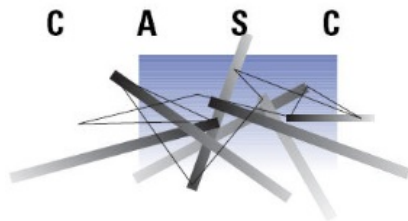
CASC & US High Performance Computing

Sue Fratkin

Washington Liaison

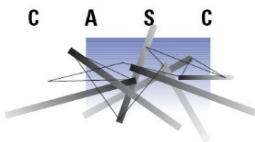
Coalition for Academic Scientific Computation

May 27, 2014



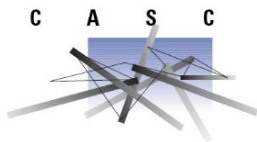
Coalition for Advanced Supercomputing Centers (CASC)

- * Coalition for Advanced Supercomputing Centers
- * Ad Hoc meetings, in response to NSF establishment of ASC program in 1985, involving those with hardware but no NSF monies
- * NSF original 5 centers: CTC, NCSA, Princeton, PSC, SDSC
- * Princeton, with ETA 10 drops out within a year



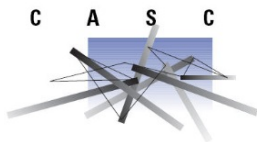
Coalition for Advanced Supercomputing Centers (CASC)

- * 1990 - CASC officially starts applies for 501C3 status
<http://www.casc.org>
- * Meetings to discuss High Performance Computing Act of 1991
- * 11 Members in 10 states are organizing group

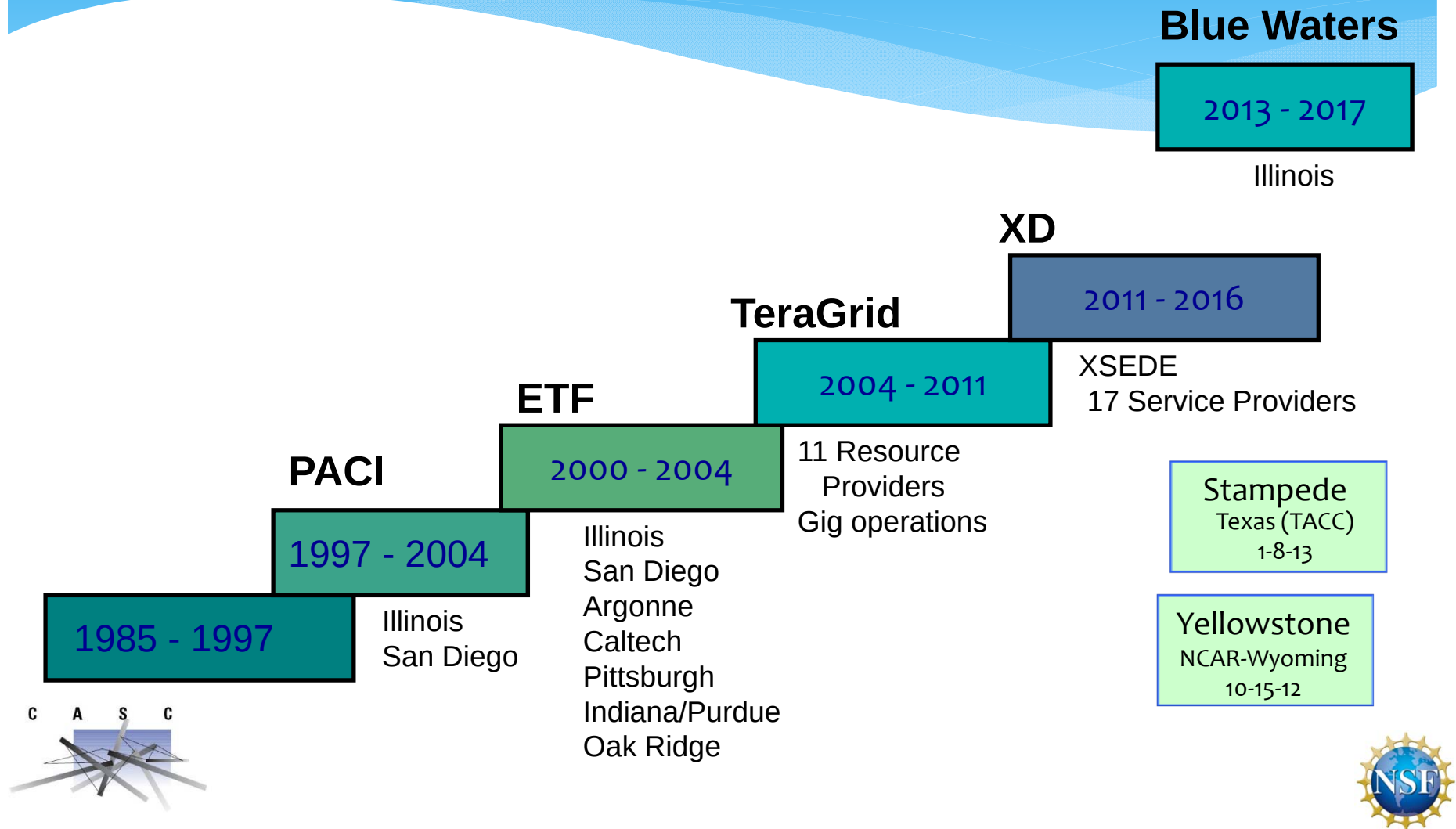


Coalition for Academic Scientific Computation

- * Today (May 2014):
 - * 79 Members in 39 states
 - * 3 Federal Labs associated with Universities - ORNL, NERSC, Argonne
 - * 2 NCAR sites - Boulder & Wyoming
 - * 1 Medical School - Mt. Sinai
- * Name changed to reflect changing nature of research, resources and usage and expanding membership

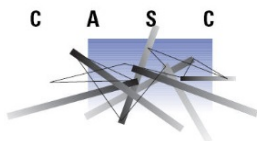
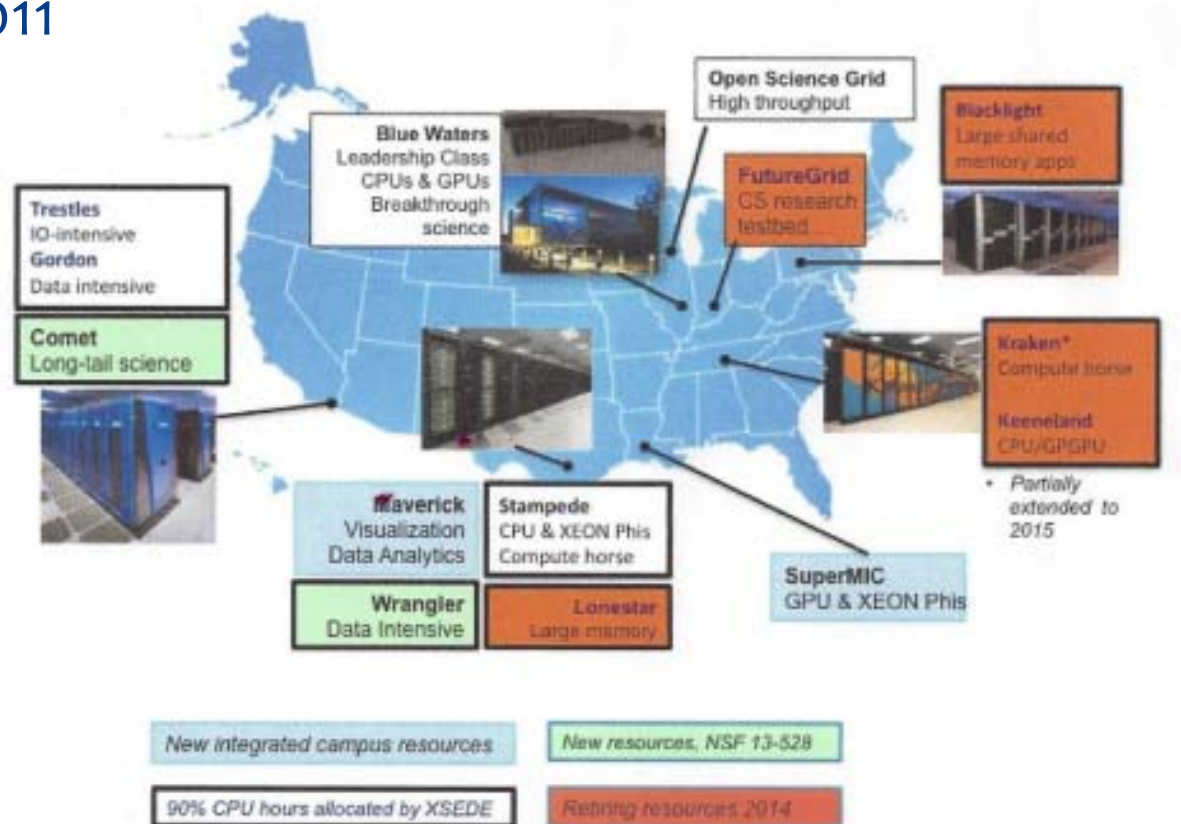


Evolution of Advanced Computing at NSF

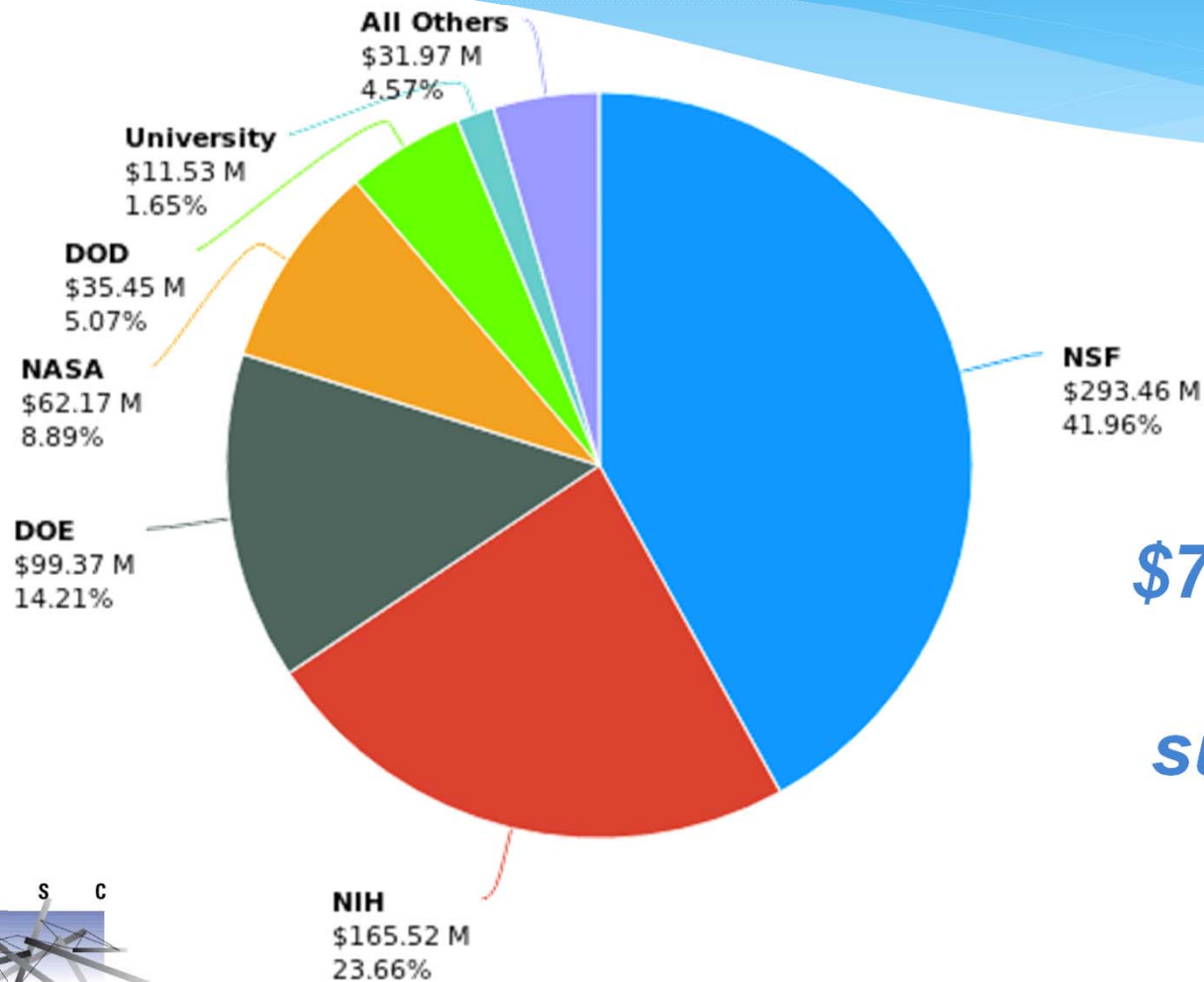


Evolution of Cyberinfrastructure at NSF

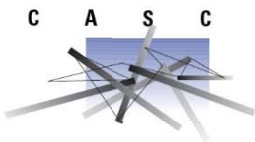
- * Office of Cyberinfrastructure formed - 2007
- * XSEDE Awarded – 2011
- * www.xsede.org



Total Research Funding Supported by XSEDE

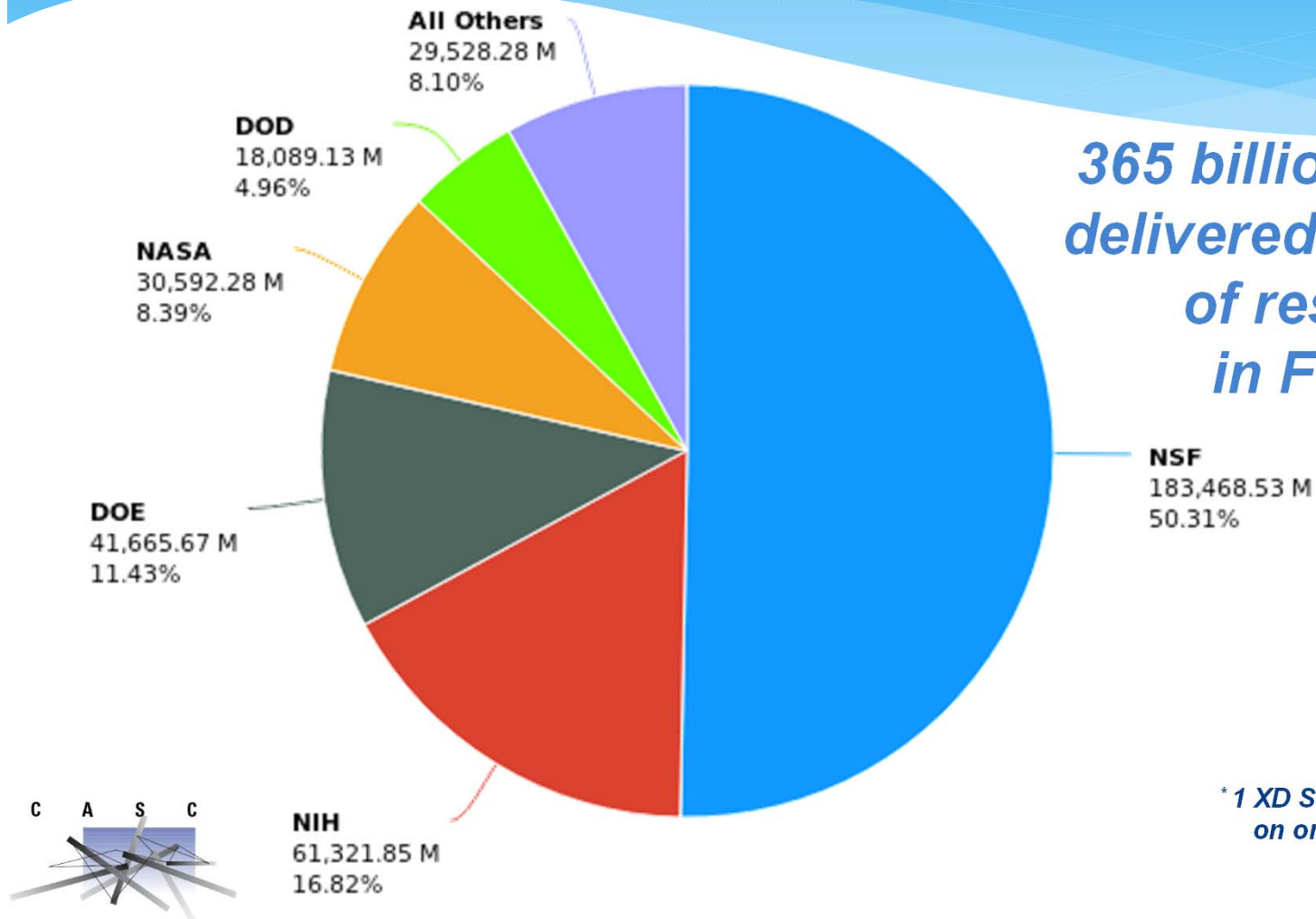


***\$700 million in
research
supported by
XSEDE
in FY2013***



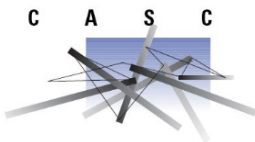
XSEDE Resources Delivered in Support of Research by Supporting Agency

**365 billion XD SUs*
delivered in support
of research
in FY2013**



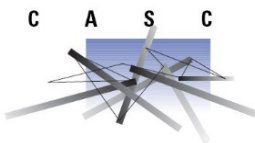
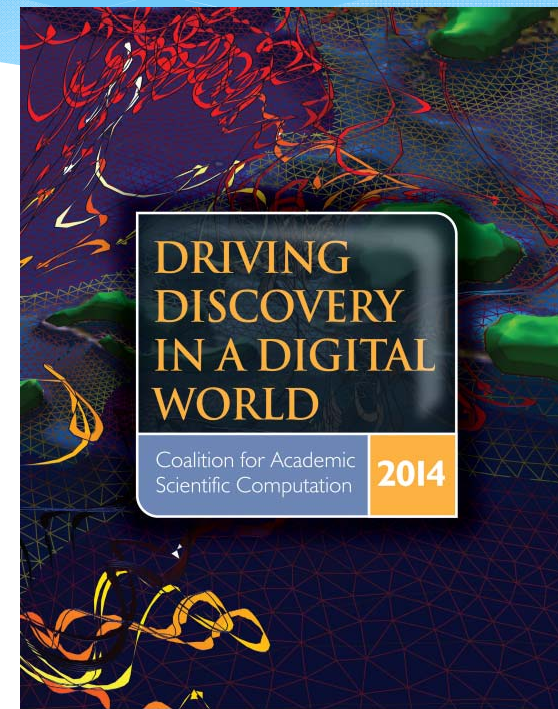
Key NSF HPC Resources

- * NCSA-Blue Waters - April 28, 2014, 1st anniversary
 - * <https://bluewaters.ncsa.illinois.edu/>
- * TACC - Stampede - January 7, 2014, 1st anniversary
 - * <https://www.tacc.utexas.edu/stampede/>



Research support provided by CASC centers

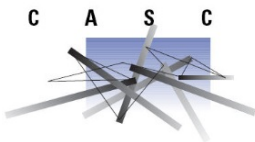
- * Energy
- * Health & Medicine
- * Industrial Innovation
- * Environment & Natural Resources
- * Matter & the Universe
- * Education & Outreach
- * Big Data
- * Nobel Prize winners



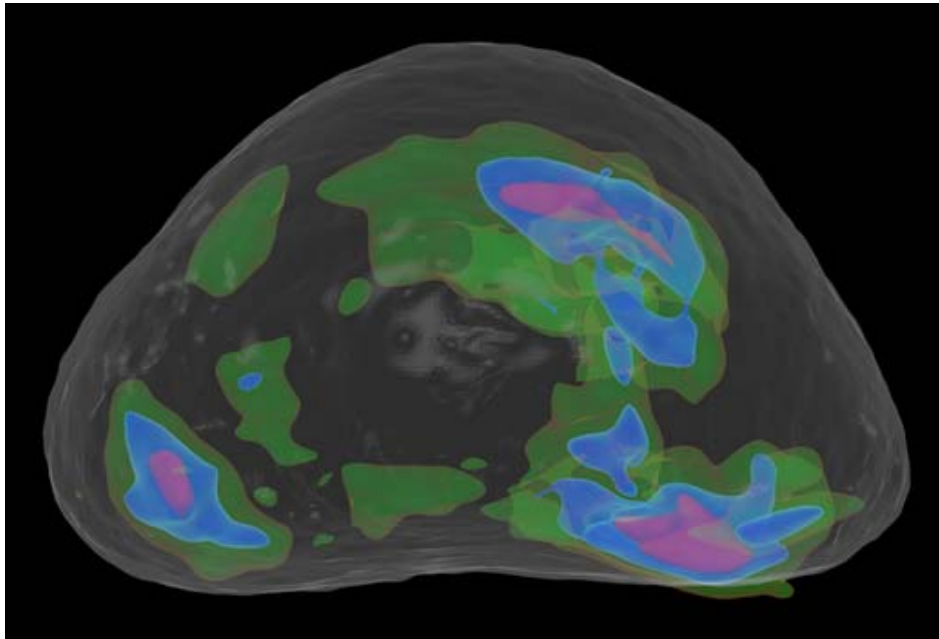
Download: <http://casc.org/papers/2014Brochure.pdf>

Industrial Innovation

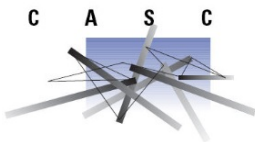
- * The Ohio Supercomputer Center is supporting a “Truck Add-On Predictor” to give smaller suppliers access to advanced systems and software, for more aerodynamic designs



Health & Medicine

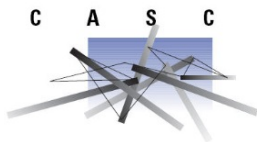


- * Case Western Reserve University researchers are mapping a “statistical atlas” of prostate cancer hotspots, to show where malignancies are most likely to occur



Matter & The Universe

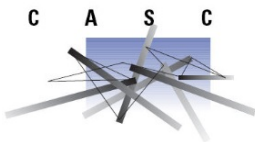
- * Researchers at U-Wisconsin and UCAR are modeling the internal energy of stars
- * This may help to explain the complex relationship between rotation, convection and magnetism in the plasma at the center of our Sun



Big Data



- * Researchers at UIUC, SDSC and PSC analyzed NASDAQ stock trade data, and found that traders were using “odd-lots” (100 shares or less) to drive stock prices without being recorded in the day’s data.
- * This and other findings led to changes in rules governing stock exchanges, requiring odd-lots to be recorded.



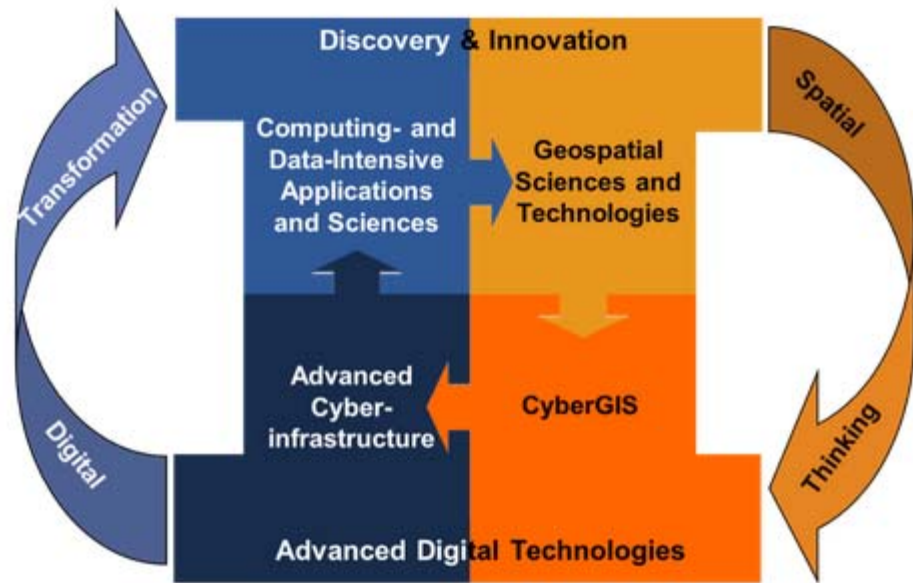
“Big Data” & Cloud Computing

Big Data systems:

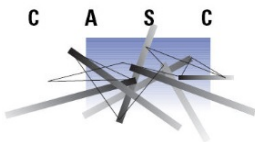
- * CyberGIS.illinois.edu
- * Wrangler at TACC
- * Gordon at SDSC

Cloud Systems:

- * Comet at SDSC
- * Rodeo at TACC

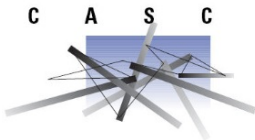


CyberGIS Center vision



Data & Clouds

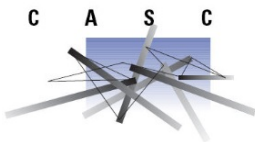
- * Additional CASC data & cloud activities
 - * XSEDE National Data Service
 - * National Consortium for Data Science - RENCi
 - * Magellan cloud - NERSC
 - * Red Cloud – Cornell University
 - * Open Cloud Consortium for HIPAA data
 - * Massachusetts Open Cloud(MOC) - Mass Green HPC Center



Cloud Computing – XSEDE Report

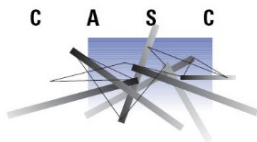
- * Top 3 Reasons Researchers and Educators use the Cloud
 1. On-demand access to burst resources
 2. Compute and data analysis support for high throughput scientific workflows
 3. Enhanced collaboration through the rapid deployment of research team web sites and the sharing of data.
- * Some workloads or domains are better suited to Cloud than others
 - * i.e. MapReduce, bioinformatics, or image analysis

<http://www.cac.cornell.edu/technologies/XSEDECloudSurveyReport.pdf>



The Future

- * Two activities underway:
 - * National Research Council – “Future Directions for NSF Advanced Computing Infrastructure to Support US Science”
 - * OSTP - review of the interagency HPC program
- * Both will provide programmatic direction at the Federal level



Thank you

Sue Fratkin
sue@casc.org