

NCSA Research Fellows 2016 Ideas Acceleration Workshop

NCSA Major Programs

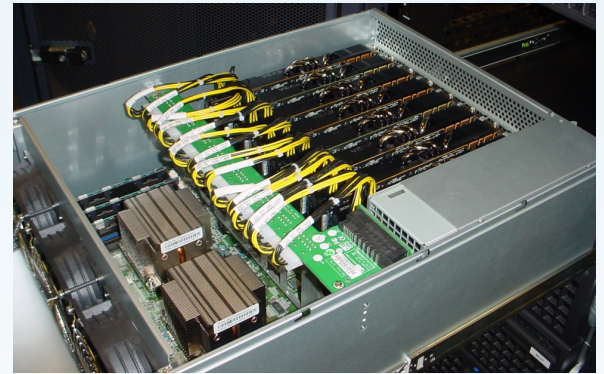
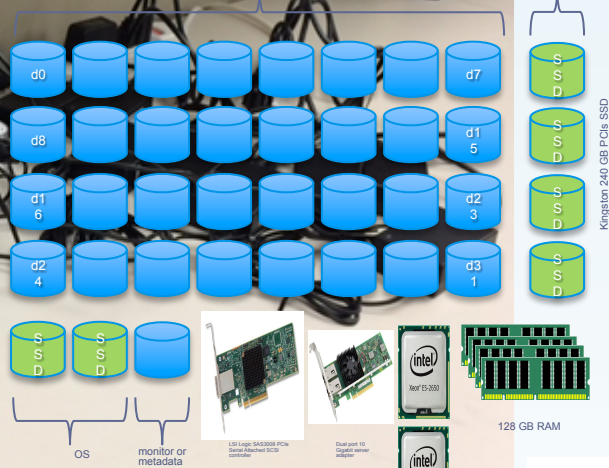
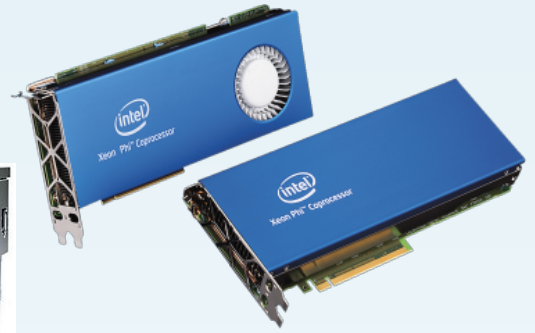
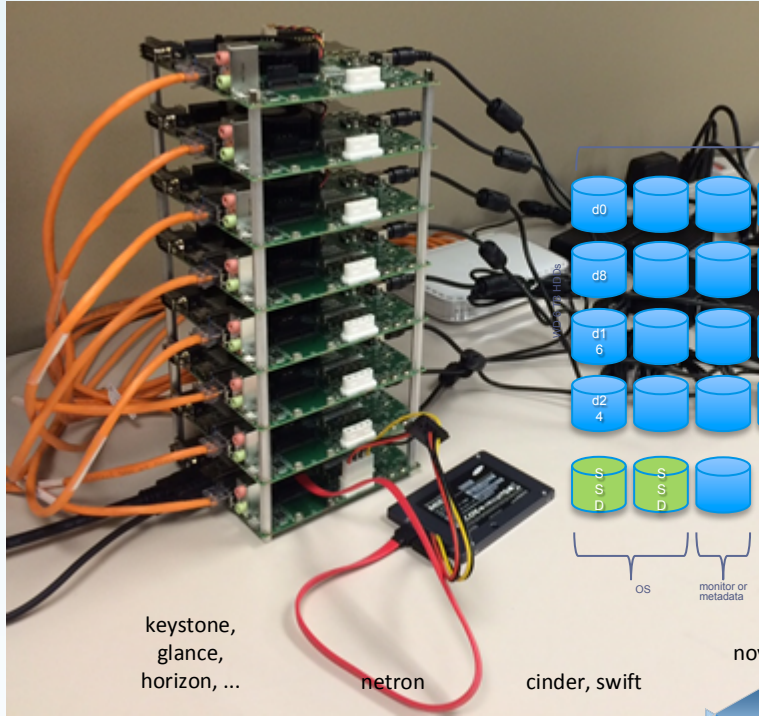


National Center for Supercomputing Applications
University of Illinois at Urbana-Champaign

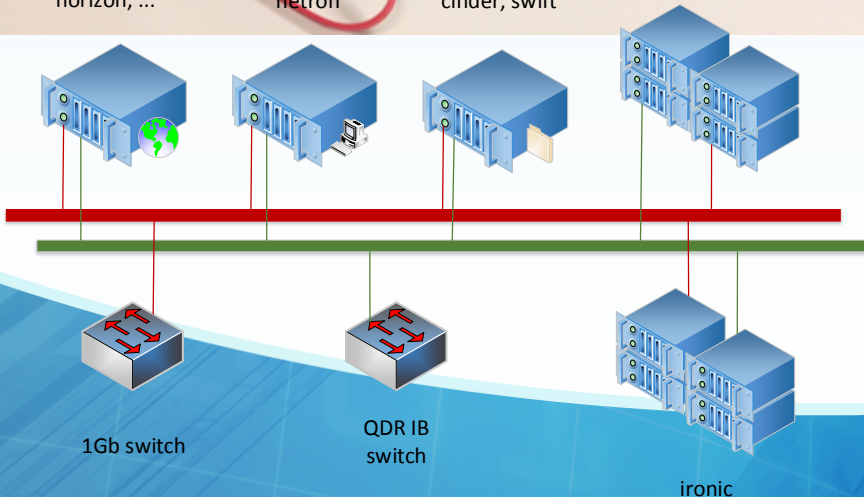
Danny Powell
Midwest Big Data Hub

Vlad Kindratenko
Innovative Systems Laboratory

Innovative Systems Lab



nova-compute



Donna Cox
Culture and Society

Culture and Society

Donna Cox (donnacox@illinois.edu)



Laboratory for Critical Technologies

- Newest group to Culture and Society
- Focus is to consider how humans are engineered and disrupted by software; how software is disrupted and engineered by humans

Institute for Computing in the Humanities & Social Sciences (ICHASS)

- Emphasis on identifying, creating and adapting computational tools that accelerate education and research
- Creates learning environments/spaces for digital discovery

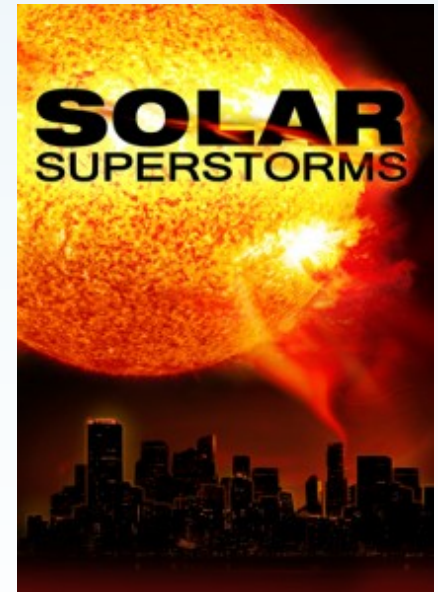
Culture and Society

eDream Institute (Emerging Digital Research and Education in Arts Media)

- Creative Production
 - Enable emerging, interdisciplinary arts in which technology plays an essential roles
- Collaborative Research
 - Identify hybrid research problems
- Education and Curricula

Advanced Visualization Laboratory (AVL)

- Creates high-res, cinematic visualizations of scientific data
- Develops and uses unique cyberinfrastructure:
 - Visualization Pipelines, Customized software, Visualization tools, and Production Methods



Seid Koric

**Economic and Societal Impact/
Private Sector Program**

Fellows Idea Acceleration Workshop (ESI/PSP)

Seid Korić, Technical Program Manager, Associate Adjunct Prof. MechSE

HPC Expertise

- Multiphysics Software (ISV and Open Source)
- Extreme Scalability
- Sparse Solvers
- Code Profiling and Optimization

Domain Expertise

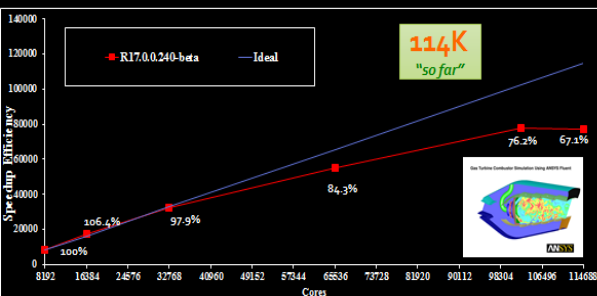
- Multi-physics/scale Modeling in Manufacturing and Material Processing
- Biomechanics
- Nuclear Engineering
- Combustion
- Molecular Dynamics ...

Proposals and Beyond

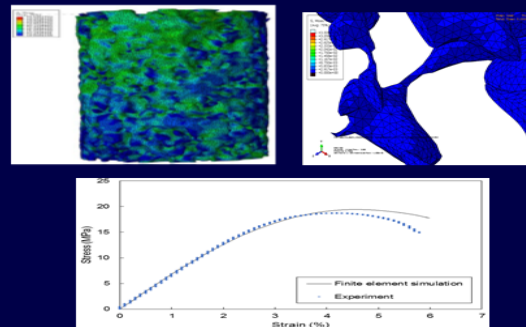
- NCSA Faculty Fellowships
- Industry
- NSF/NIH/NIST
- Mixed .gov/.com (NDEMC, DMDII, AFFOA)
- Project Management
- Business Development

Ansys-Fluent ver. 16.0 "beta"

Dr. Ahmed Taha, Blue Waters (Cray CLE6) "Ansys Gas Turbine Combustor, 830M Cells, Aug. 2015



Direct Numerical Simulation of Bone Plasticity and Strength
Seid Korić, Fereshteh Sabet, Iwona Jasiuk, 2015-2016



Kenton McHenry

Innovative Software and Data Analysis

National Data Service

NCSA *Innovative Software & Data Analysis*

- Research & Development
- Reusable software tools & frameworks for data analysis
- Bridging and amplifying efforts across different projects
- New custom software tools & frameworks



The National DATA SERVICE

- National effort to bring together R&D efforts surrounding data
- In collaboration with the RDA implementing standards and protocols
- Towards a world where it is easier to search, publish, link, and reuse data of all kinds
- From the Internet to the “DataneT”



RESEARCH DATA ALLIANCE

Jay Alameda
XSEDE

A hand is pointing at a screen. The screen shows a terminal window with some code. Overlaid on the screen is a white rounded rectangle containing the text 'This is XSEDE.'

This is XSEDE.

XSEDE gives scientists, engineers, and researchers a pathway to digital science resources like powerful supercomputers, massive collections of data, and custom-made tools that are now critical to the success of science.

XSEDE integrates these resources and services, makes them easier to use, and helps more people use them. **XSEDE** helps you address the most important and challenging problems facing the nation and world.

XSEDE

Extreme Science and Engineering
Discovery Environment



XSEDE is supported by the
National Science Foundation.

What you can do with XSEDE



GET TIME: Use custom-made coordinated allocation system to get access to NSF high-end resources like Stampede, Comet, SuperMIC and more.
xsede.org/allocations



GET HELP: Experts from XSEDE's Extended Collaborative Support Service (ECSS) will work closely with your team on visualization, code optimization, and other challenges.
xsede.org/ecss



GET TRAINING: Take advantage of classes in HPC, visualization, data management, distributed and grid computing, science gateways, and more.
xsede.org/training



GET ENGAGED: Students can gain real-world knowledge and development experience, and be encouraged to pursue advanced degrees and professional careers in STEM.
xsede.org/web/guest/engagement

XSEDE

Extreme Science and Engineering
Discovery Environment



XSEDE is supported by the
National Science Foundation.

UNDER THE HOOD, SPECS AND DETAILS

Advanced distributed systems architecture, rooted in user requirements and hardened by systems engineering. Includes expansive list of more than 200 pieces of open-source software.

Internet2 and XSEDEnet-configured private network between XSEDE service provider sites across a shared 10G bandwidth.

XSEDE User Portal allows user to manage jobs, report issues and analyze and visualize results. Portal now available as free apps in Google Play and Apple App store.

Advanced cybersecurity allows easy access to users and prevents attacks.

The Campus Champions program brings together XSEDE and various campuses to promote cyberinfrastructure in education and research.

Led by NCSA, XSEDE is a ground-breaking distributed cyberinfrastructure project funded by the National Science Foundation. Other partners include: Cornell, Indiana, Julich, NCAR, NICS, Ohio State, Pittsburgh, Purdue, Rice, SDSC, Shodor, SURF, TACC, Berkeley, University of Chicago, and UVA.



/XSEDEscience



@XSEDEscience



xsede.org

Questions?
info@xsede.org

Have you reached
a plateau in your
computational
simulations?

Would you like
to see if your
code can run
10, 50 or even
100 times faster?

Do you want to
see if advanced
computing can
help you in
your work?

XSEDE's Extended Collaborative Support Services (ECSS) program has experts that can provide dedicated support for up to a year at no cost to your project.

Expertise available in many areas

- Performance analysis
- Petascale optimization
- Efficient use of accelerators
- I/O optimization
- Data analytics
- Visualization
- Science gateways
- Work and data flow systems
- Expertise with new domain areas such as digital humanities

ECSS staff have domain expertise and advanced degrees. They are scientists as well as cyberinfrastructure experts.

www.xsede.org/ecss
help@xsede.org

XSEDE

Extreme Science and Engineering
Discovery Environment



Greg Bauer
Blue Waters

Blue Waters

Science and Engineering Application Support

- **Basic and Advanced Application Support on Blue Waters.**
- **Work with projects on or moving to Blue Waters.**
- **Domain Specialists**
 - **CFD / Solvers**
 - **Chemistry**
 - **Numerical Methods**
 - **BioInfo**
 - **HPC Generalists**
- **Interests**
 - **Performance and Scaling**
 - **Workflows**

