# An Overview of CSNY, the Cyberinstitute of the State of New York at buffalo


Russ Miller
CSNY
Computer Sci & Eng, SUNY-Buffalo
Hauptman-Woodward Medical Res Inst


Open Science Grid

GRID

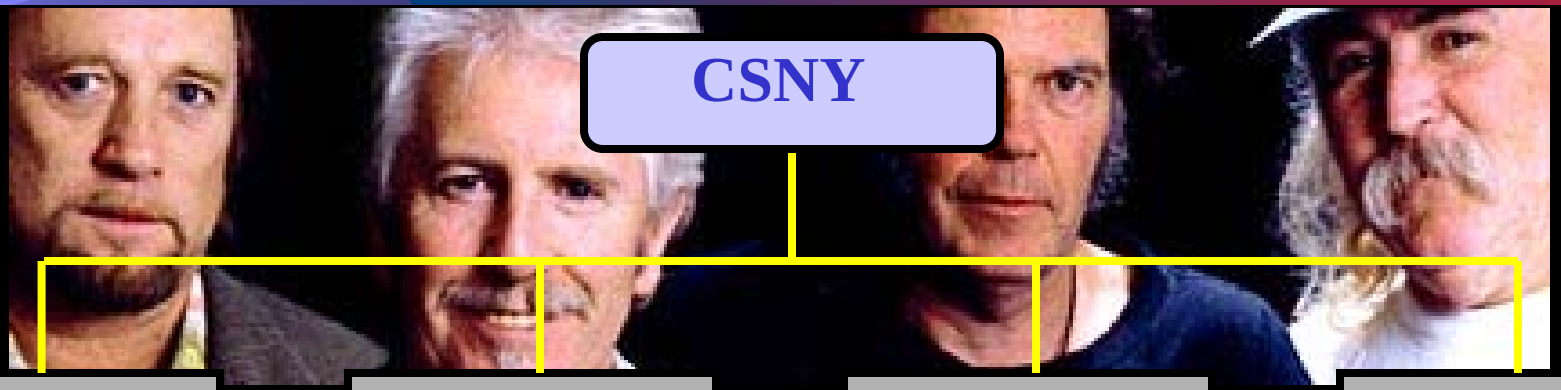
Advanced
Center for Computational Research
Data
Center

NSF, NYS, Dell, HP

# Cyberinfrastructure

- Digital Data-Driven Society
- Knowledge-Based Economy
- CI, HPC, & CSE are Critical to 21st Century
  - Discovery
  - Economic Development
  - EOT
- Requires Development of Software, Algorithms, Portals, Interfaces
- Seamless, Ubiquitous, Secure, Interwoven, Dynamic:
  - Compute Systems, Storage, Instruments, Sensors
  - Computational Methodologies (Algorithms)
  - Networking
  - HCI

# Organization of CSNY



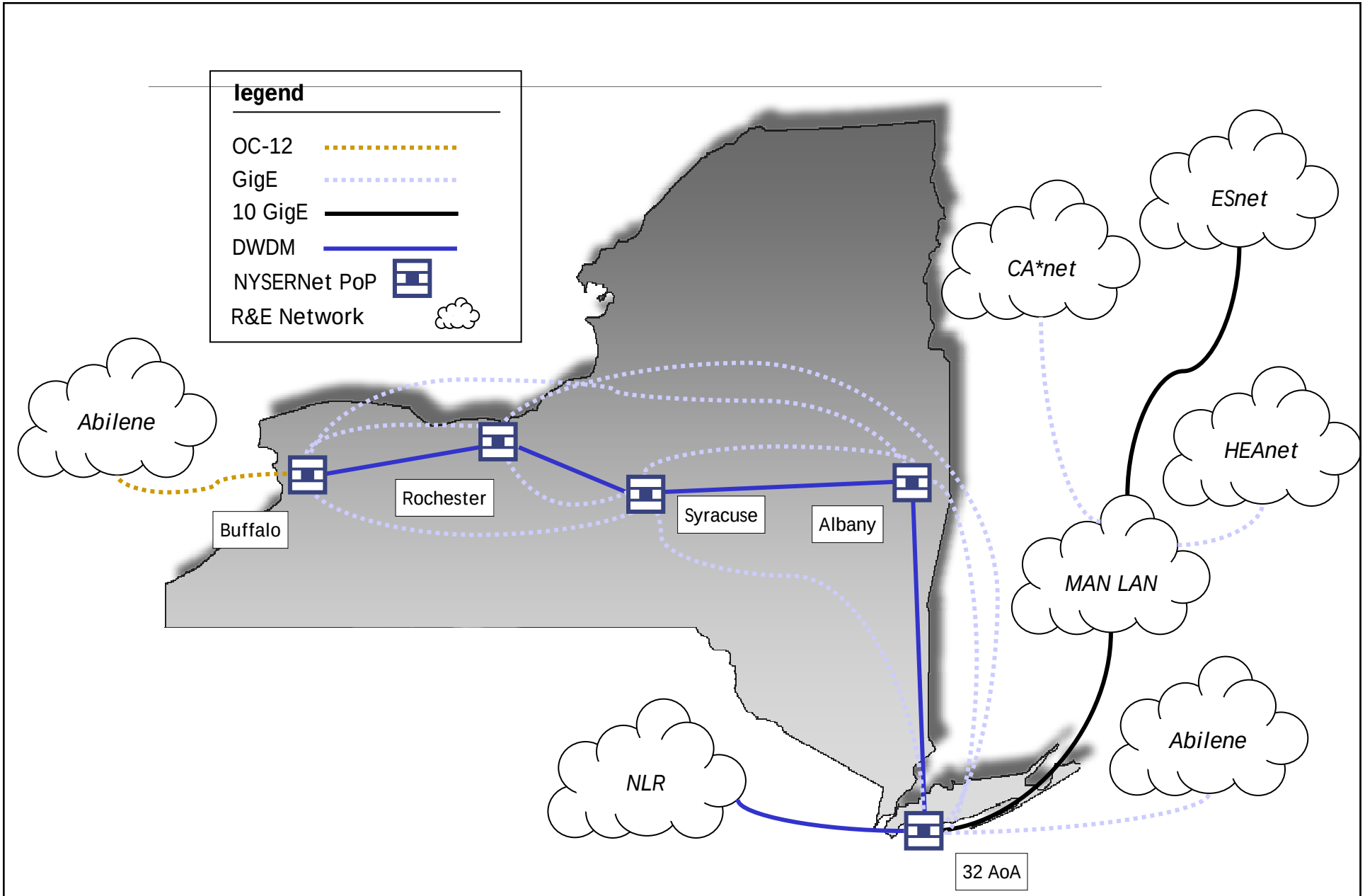
**CSNY**

## HPC (CCR)
- Computing
- Data
- Visualization
- Networking

## CSE
- MultiScale
- Sciences
- Engineering
- Life Sciences
- Media

## CI
- Scheduling
- Monitoring
- Virtual Reality

## Enabling
- Programmers
- GUI Design
- Integration




Courtesy of NYSER*Net*

# HPC: Overview of CCR's Resources

- **Dell Linux Cluster (10TF peak)**
  - 1600 Xeon EM64T Processors (3.2 GHz)
  - 2 TB RAM; 65 TB Disk
  - Myrinet / Force10
  - 30 TB EMC SAN
- **Dell Linux Cluster (3TF peak)**
  - 600 P4 Processors (2.4 GHz)
  - 600 GB RAM; 40 TB Disk; Myrinet
- **SGI Altix3700 (0.4TF peak)**
  - 64 Processors (1.3GHz ITF2)
  - 256 GB RAM
  - 2.5 TB Disk
- **BioACE: Bioinformatics System**
  - Sun V880 (3), Sun 6800
  - Sun 280R (2)
  - Intel PIIIs
  - Sun 3960: 7 TB Disk Storage
- **EMC SAN**
  - 35 TB Disk
  - 190 TB Tape
- **Staff**
  - 11 Technical Staff
  - 3 Administrative Staff

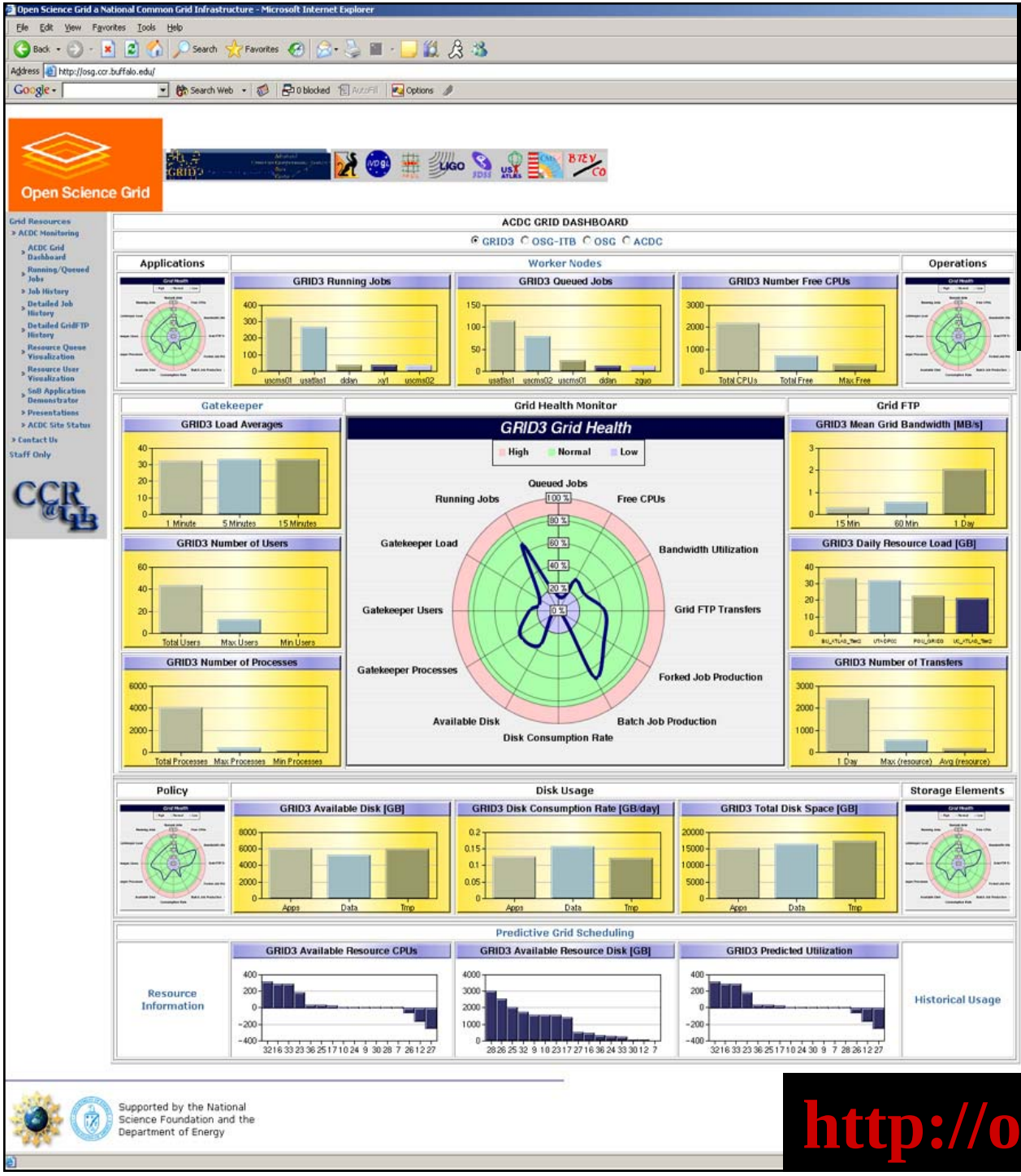
# Computational Science & Engineering @ SUNY-Buffalo

- **Life Sciences**
- **MultiScale Analysis**
- **Environmental Modeling**
- **Multimedia**
- **Grid-Enabling Application Templates**
  - **Structural Biology (*SnB*)**
  - **Groundwater Modeling (*Ostrich*, *POMGL*, *Split*)**
  - **Earthquake Engineering (*EADR*)**
  - **Computational Chemistry (*Q-Chem*)**
  - **Geographic Information Systems & Biohazards (*Titan*)**

# CSNY CyberInfrastructure

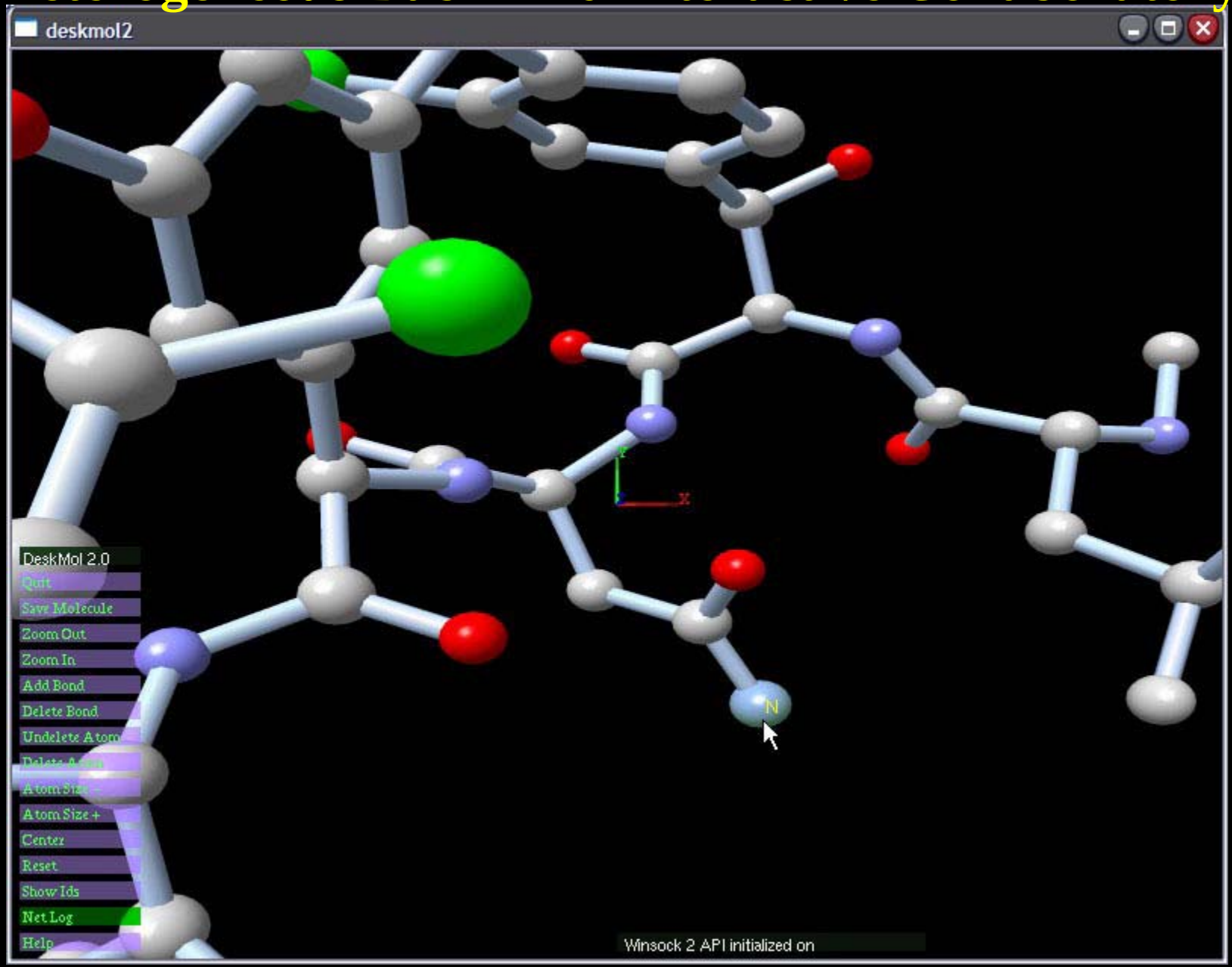
- **Integrated Data Grid**
  - **Automated Data File Migration based on profiling users.**
- **Lightweight Grid Monitor (Dashboard)**
- **Predictive Scheduler**
  - **Define quality of service estimates of job completion, by better estimating job runtimes by profiling users.**
- **Dynamic Resource Allocation**
  - **Develop automated procedures for dynamic computational resource allocation.**
- **High-Performance Grid-Enabled Data Repositories**
  - **Develop automated procedures for dynamic data repository creation and deletion.**
- **Virtual Reality**

# ACDC-Grid Monitoring: The ACDC-Grid DASHBOARD




**http://osg.ccr.buffalo.edu**

# Heterogeneous Back-End Interactive Collaboratory




User starts up – default image of structure.

# CSNY Enabling Staff

- **Director**
- **Programmers**
  - **Interface with Computational Scientists and Disciplinary End Users**
  - **Grid Integration**
  - **GUI Development**
  - **Implement CI Advances**
- **Students**
  - **Undergraduates, Graduates, Post-Docs**

# CSNY Projects

- Western New York Grid (*)
- Grass Roots NYS Grid
  - SUNY-Buffalo *
  - Niagara University *
  - Canisius College
  - SUNY-Geneseo *
  - SUNY-Binghamton
  - Columbia
  - Hauptman-Woodward Inst. *
  - Roswell Park Cancer Institute
- Dashboard
- Predictive Scheduler
- Participation
  - OSG
  - OSG-ITB
  - TeraGrid
  - CaBIG
- GRASE VO: Grid Resources for Advanced Science and Engineering Virtual Organization
  - (Non-Physics Research)
  - Structural Biology
  - Groundwater Modeling
  - Earthquake Engineering
  - Computational Chemistry
  - GIS/BioHazards


miller@buffalo.edu
CCR