

Peering into the Future of the Access Grid

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Announcements

- Transportation: need to clear your vehicle onto the site for pickup or talk with concierge to help assist you
- 145+ people here today, coming from 71 different organizations
- Our next AG retreat has been tentatively planned for _____(date) in Toronto, Canada, organized by Ryerson University
 - also thank you to UCAR/NCAR and University of Buffalo for volunteering to host retreats as well
- We request all talks, including individual panel presentations need to be sent or provided to Mary Fritsch (fritsch@mcs.anl.gov) so we may compile our proceedings for you online
- A special thanks to all of our speakers and sponsors in all our retreat tracks today for their diverse content and effort....

What's Next \Rightarrow Active Spaces

- Proactive Environments
 - Models of use
 - Situational awareness
- Spontaneous integration of information technology resources in an environment
 - Displays, services, input devices, communications, workflows
- Integration of Tiled Displays, PDAs, Auxillary displays etc
 - Lab of the future enterprises
 - Push model for AG3
- Visiting slots for AG developer
- Visiting slots for AS researchers



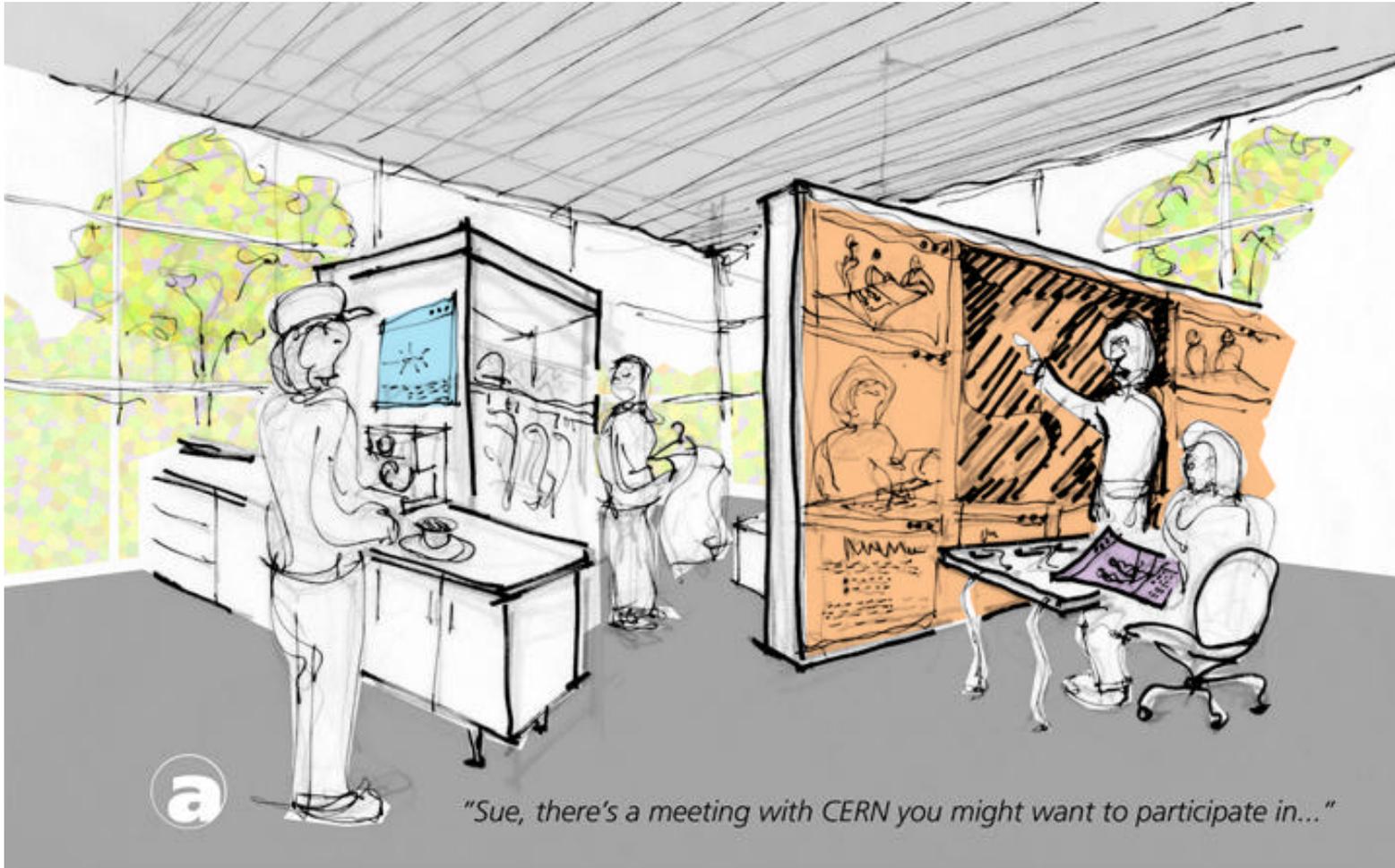


Scientific Workspace of the Future

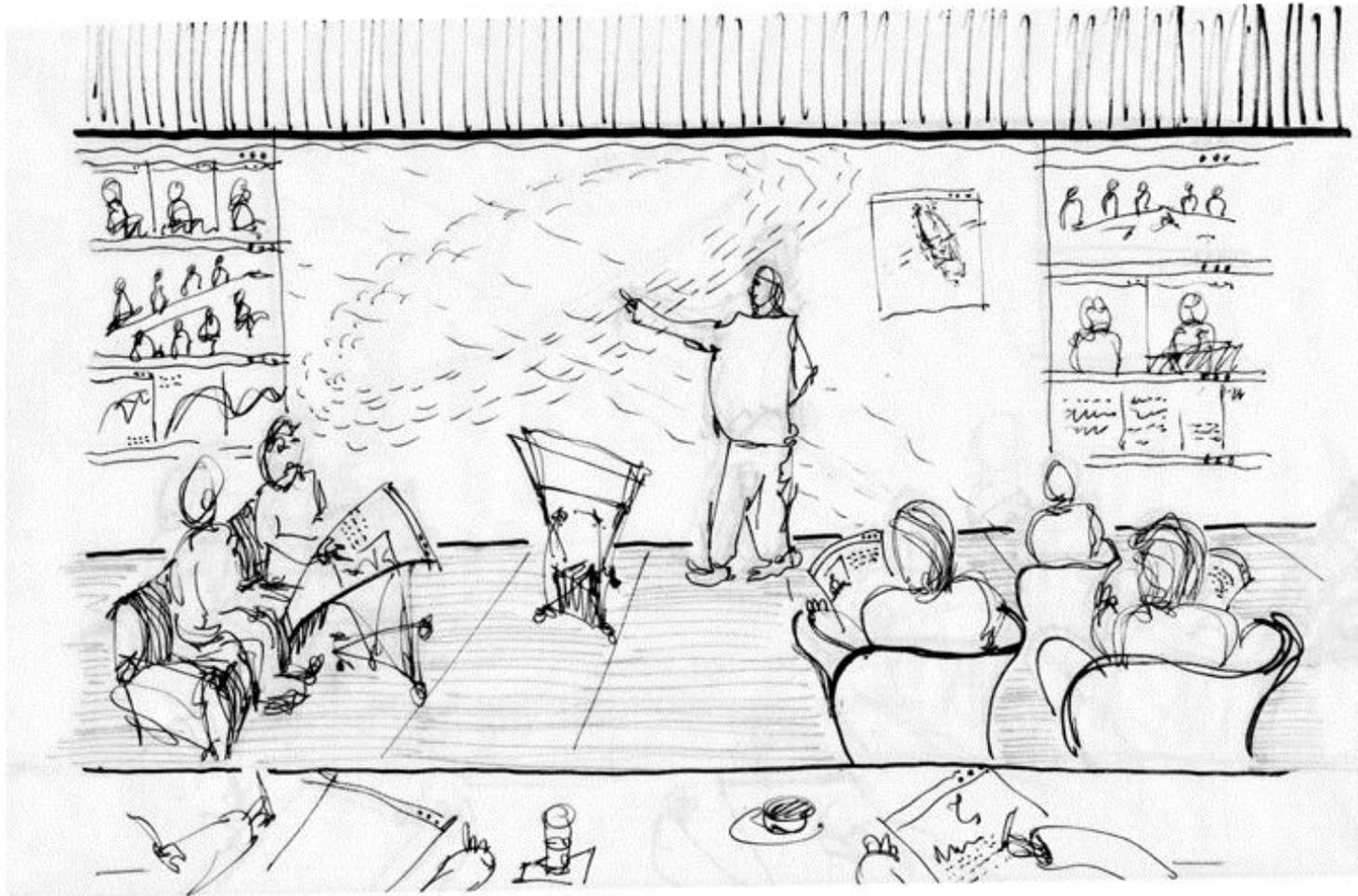
Goals of the SWOF Expedition

- Deploy two Virtual Laboratories
 - Atmospheric Science
 - Computational Molecular Biology
- Integrate and deploy advanced visualization capability for the Access Grid
 - Augment AG node environments (3D/VR, ParaView, etc.)
 - Create new virtual venue visualization services
- Integrate and deploy collaborative applications interfaces to AG via AG 2.0 Virtual Venue server and planned AG OGSA capabilities
- Work with EOT and PACS to deploy AG nodes and further develop training and support materials

Ad Hoc Collaboration

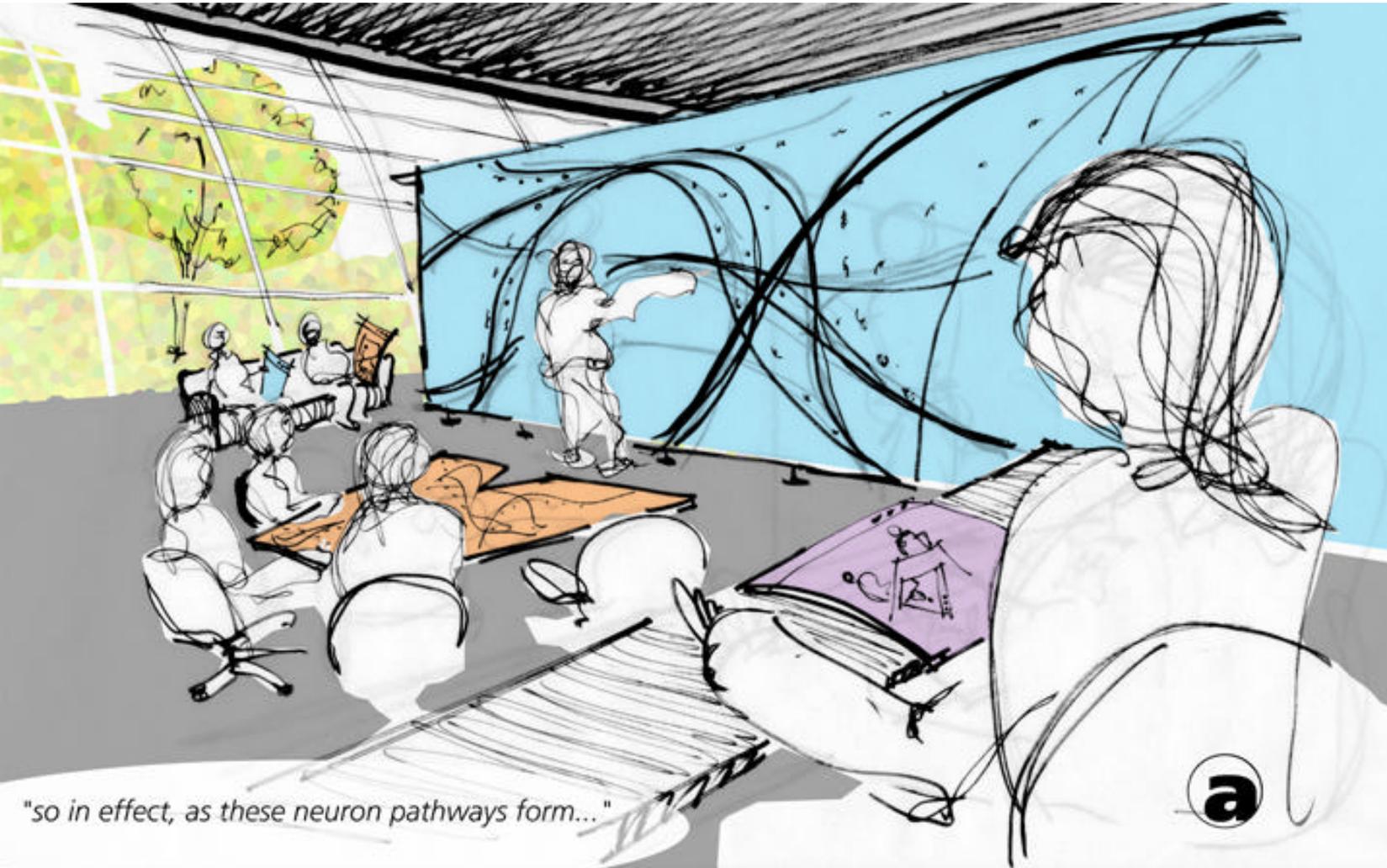


Distance Learning



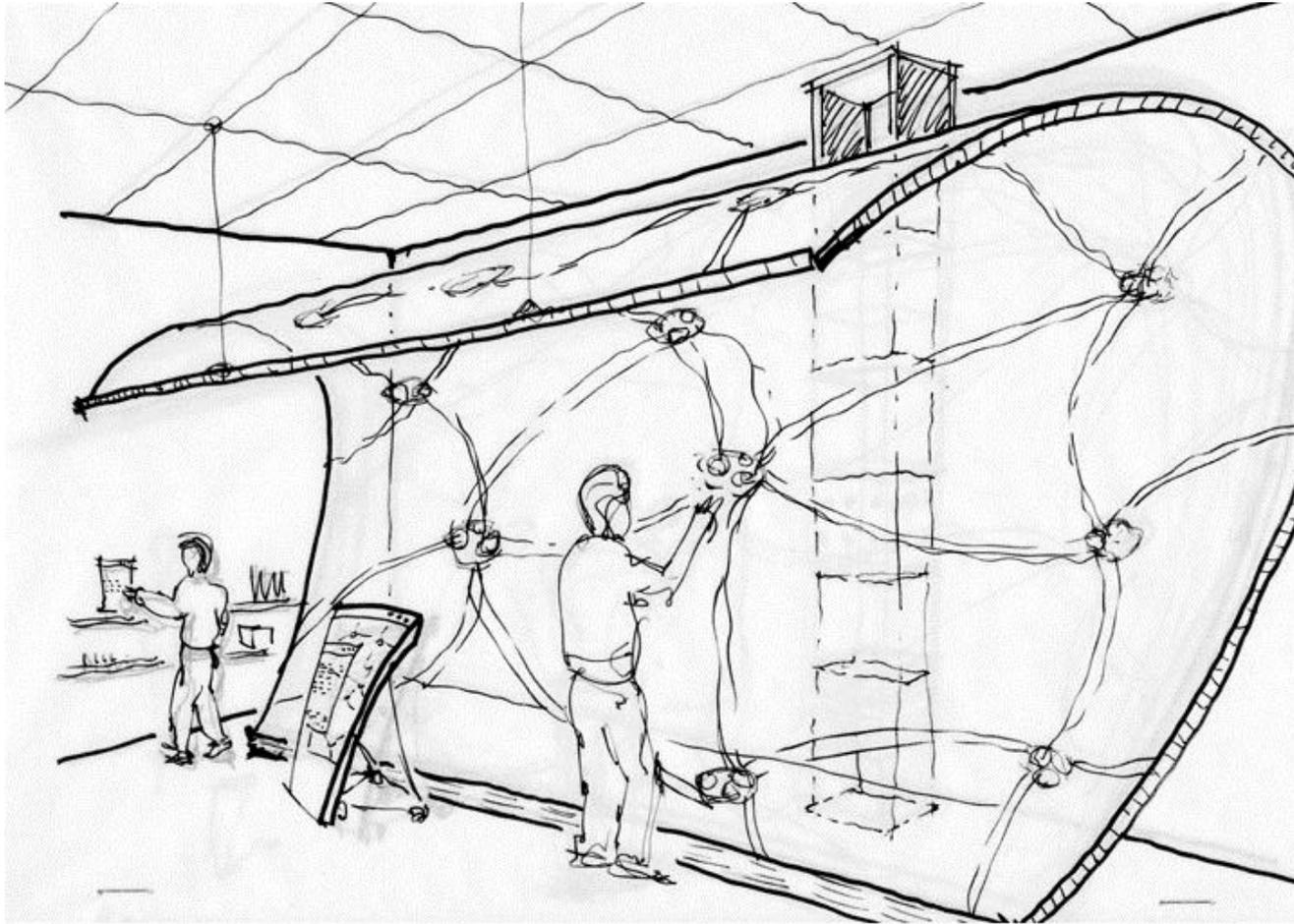
" if over time, the galaxy stretches like..."

Distributed Exploratory Analysis



"so in effect, as these neuron pathways form..."

Interactive Scientific Computing



"let's re-run the simulation with this molecule over here..."

SWOF Team

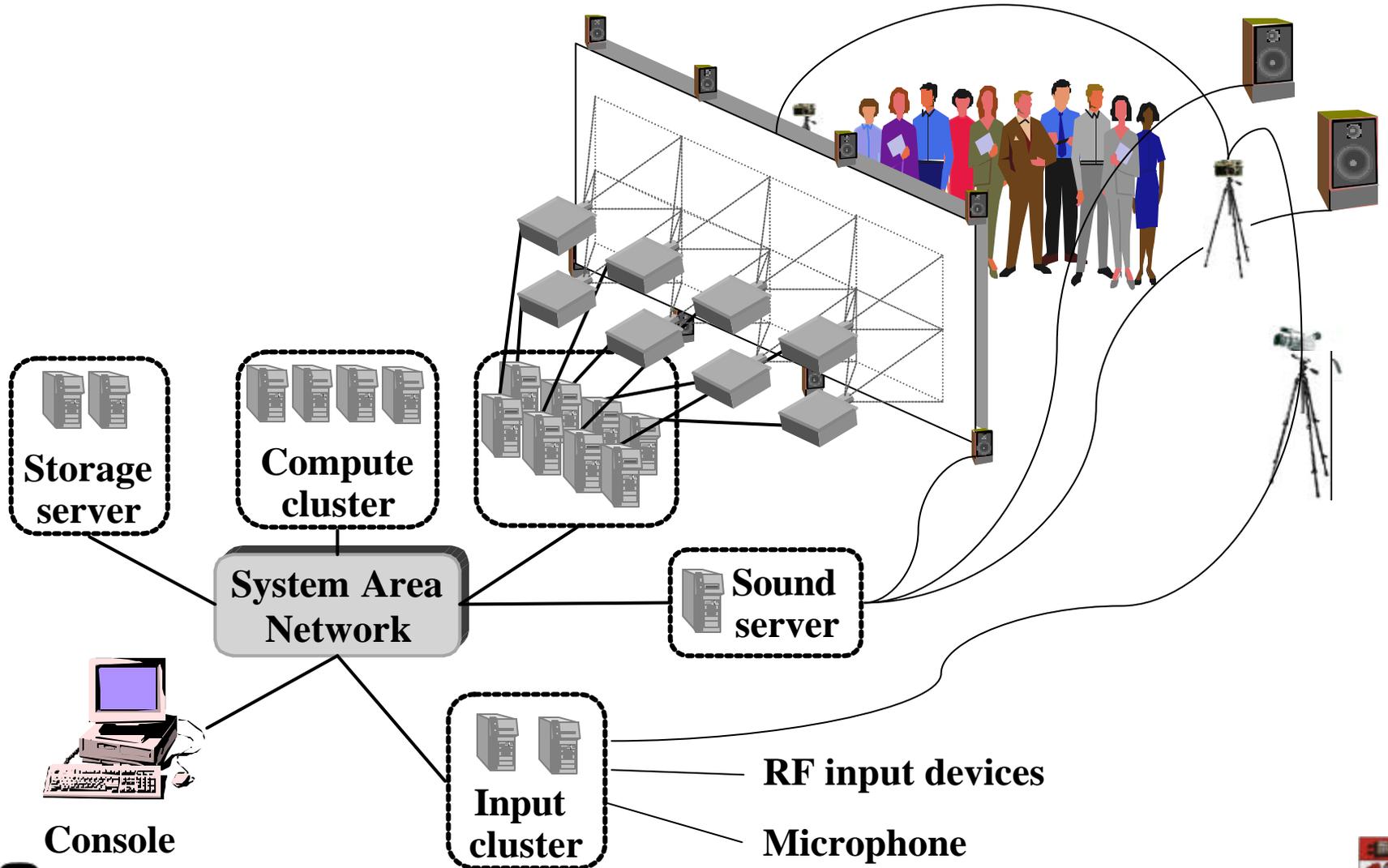
- Applications
 - Climate
 - Bob Wilhelmson (NCSA, Lead)
 - Don Middleton, (NCAR)
 - Biology
 - Eric Jakobsson (NCSA, Lead)
 - Nagiza F. Samatova (ORNL)
 - Natalia Maltsev (ANL)
 - Klaus Schulten (NCSA)
- Technology Integration
 - Ivan Judson (ANL, Lead)
 - Jim Aherns (LANL)
 - Dave Semeraro (NCSA)
 - Sam Fulcomer (Brown)
 - Tom DeFanti (EVL)
 - Glen Bresnahan (BU)

Terry Disz (ANL, Liaison between Applications and Technology Efforts)

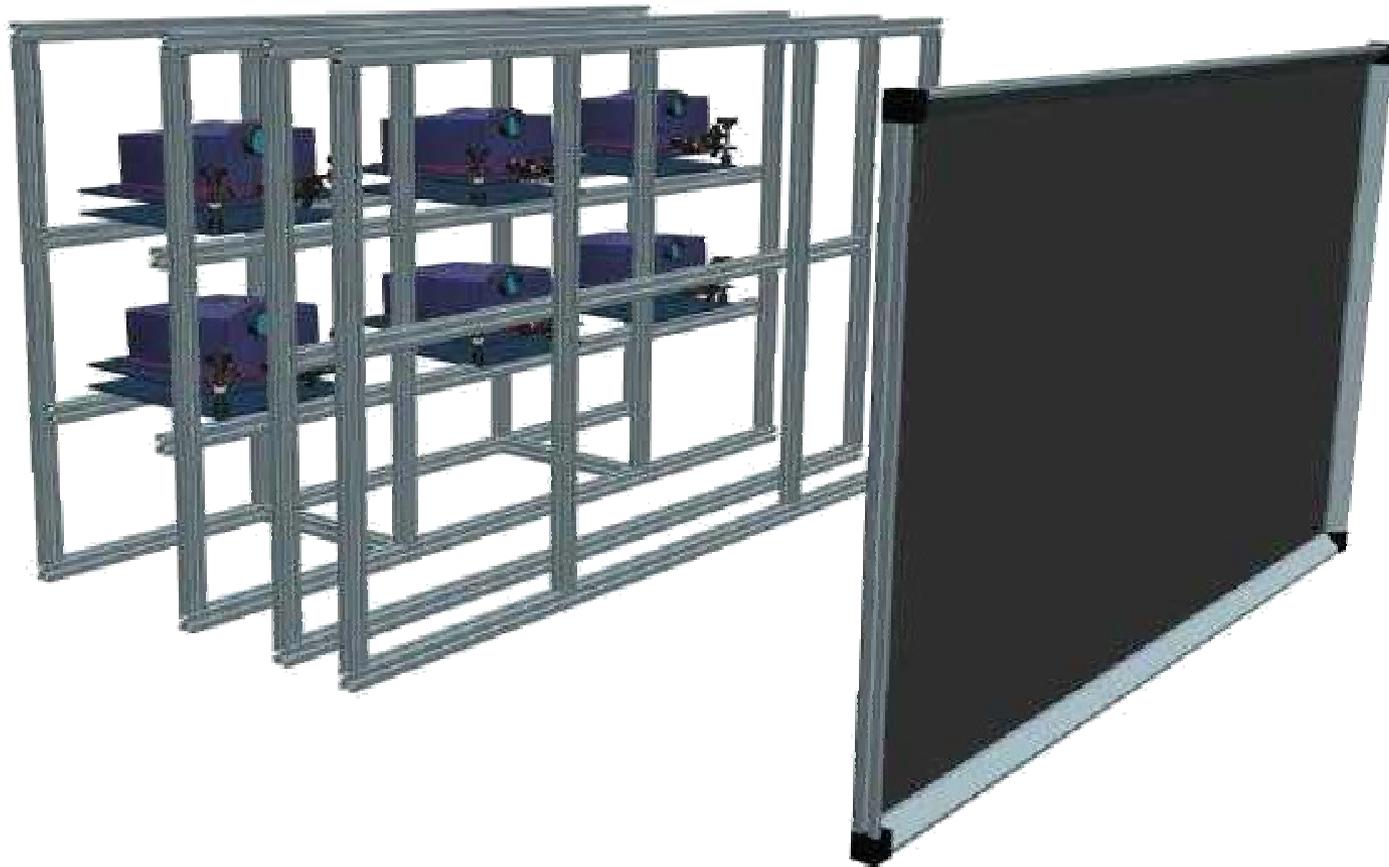
Rick Stevens – Overall PI

Michael Papka – Day to Day oversight and project management

A Scalable Display Wall

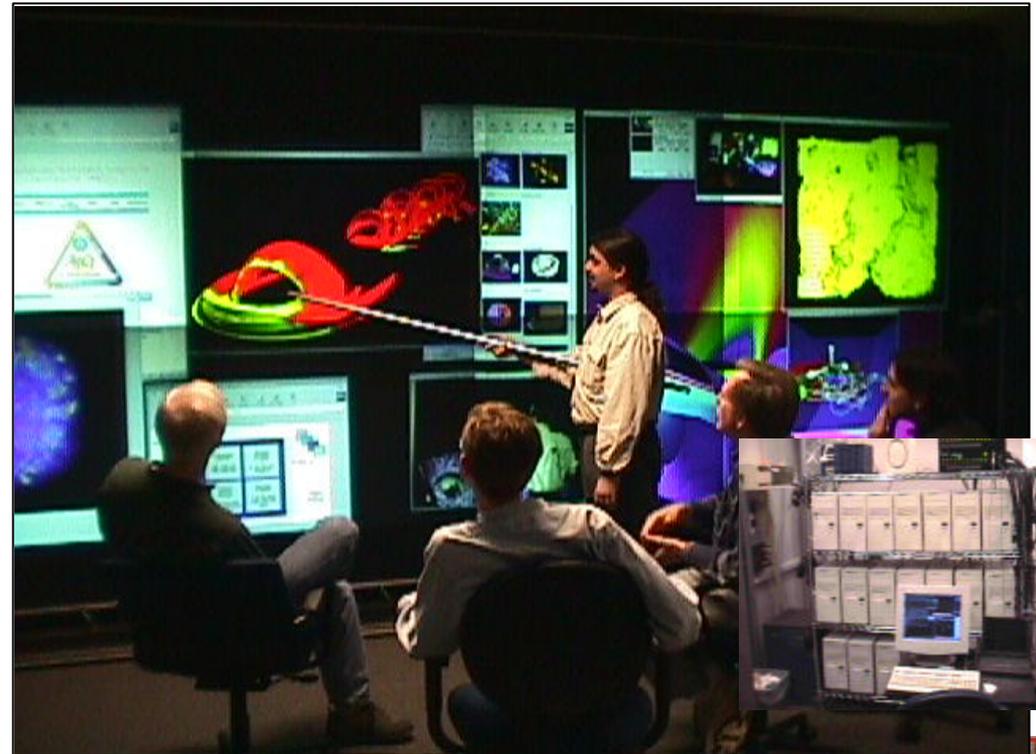


Basic Geometry of Planar Tiled Display

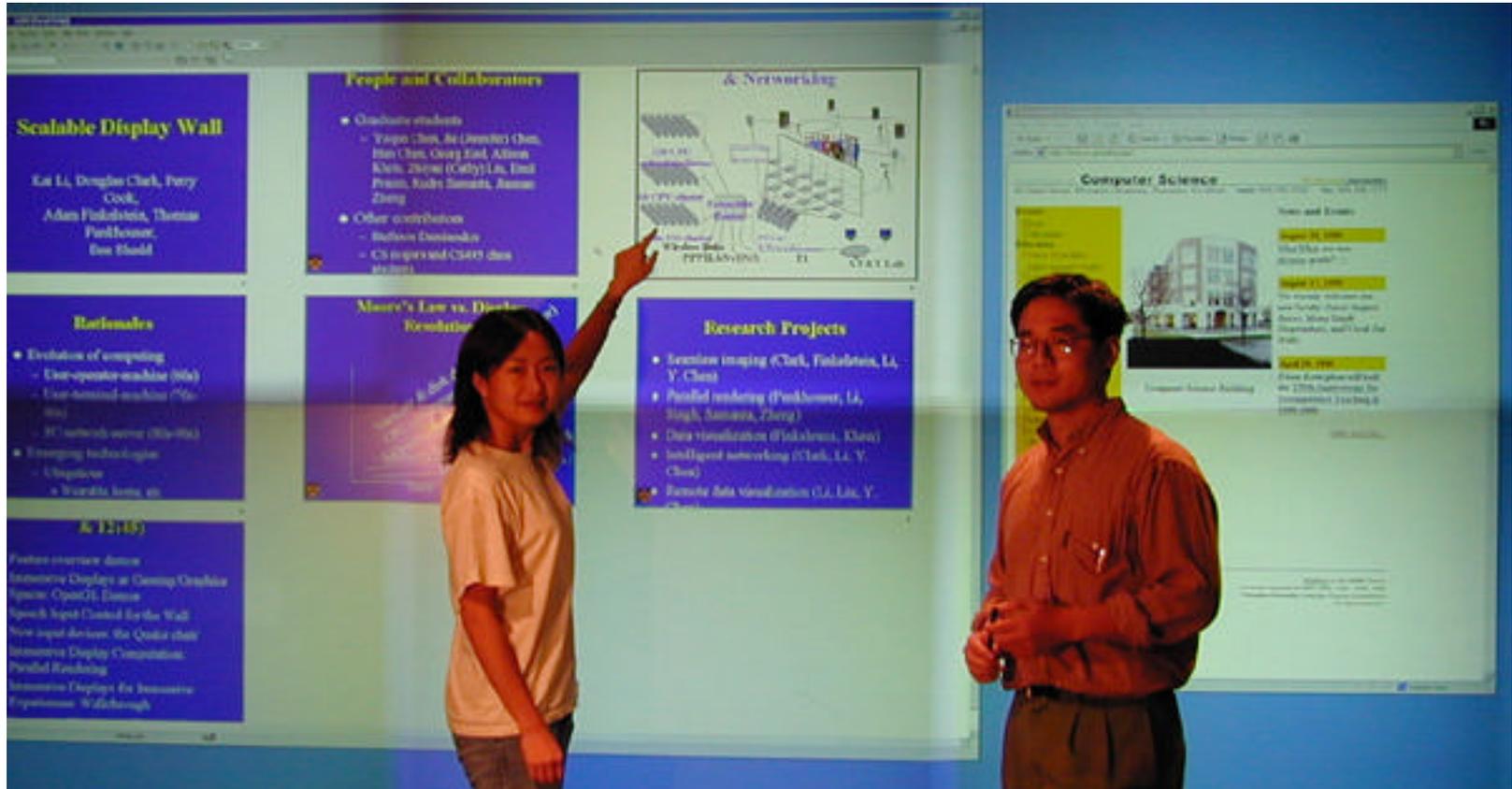


ActiveMural (Argonne)

- Argonne, Princeton and UIUC Collaboration
- 8' x 16' display wall
 - Jenmar Visual Systems BlackScreen™ technology, > 10000 lumens
 - 8 LCD → 15 DLP → 24 DLP
 - 8-20 MegaPixels
 - SGI and Linux drivers
 - VR and ActiveSpace UI



Large Is Good: Window Applications



The Space Station (Princeton)



Interactive Mural (Stanford)

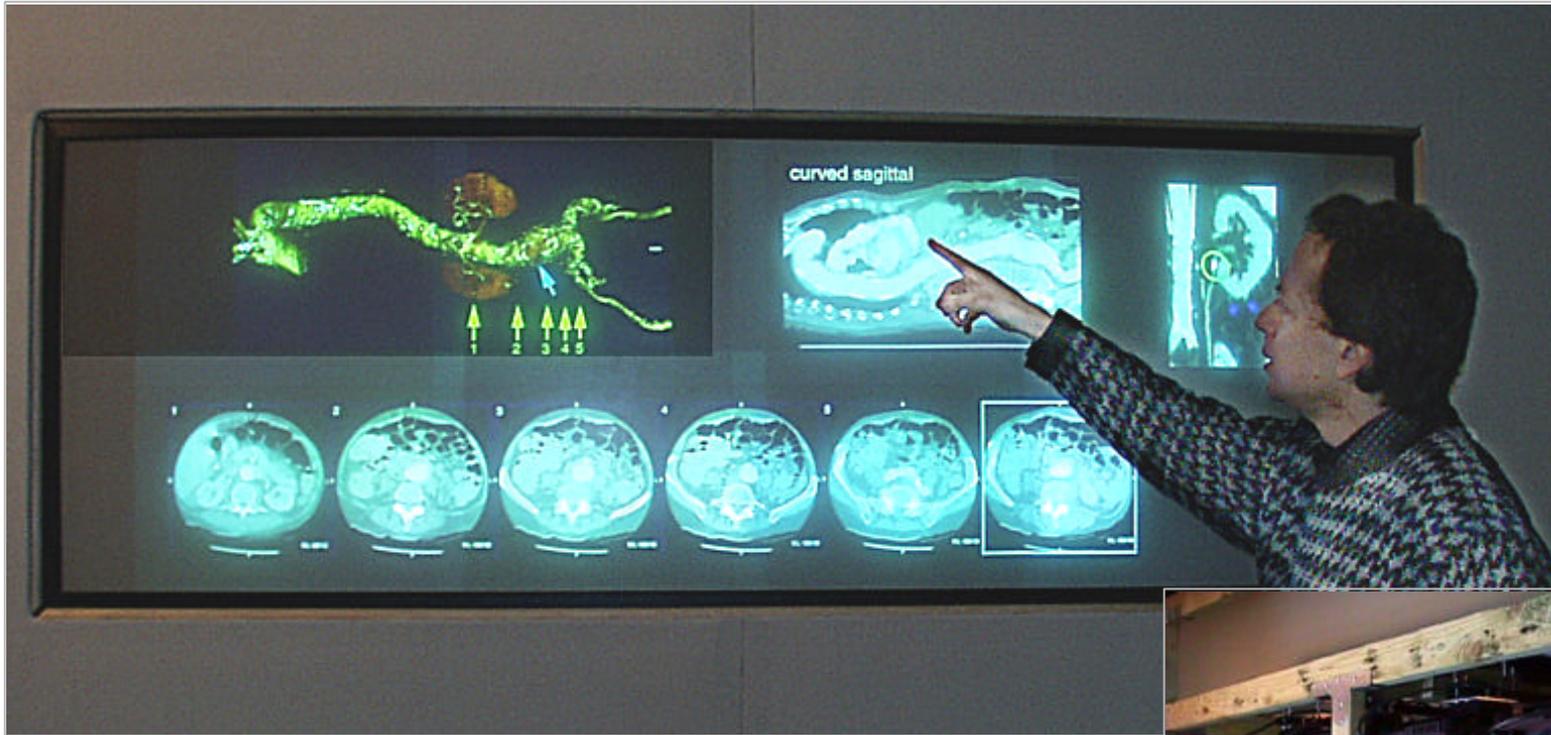


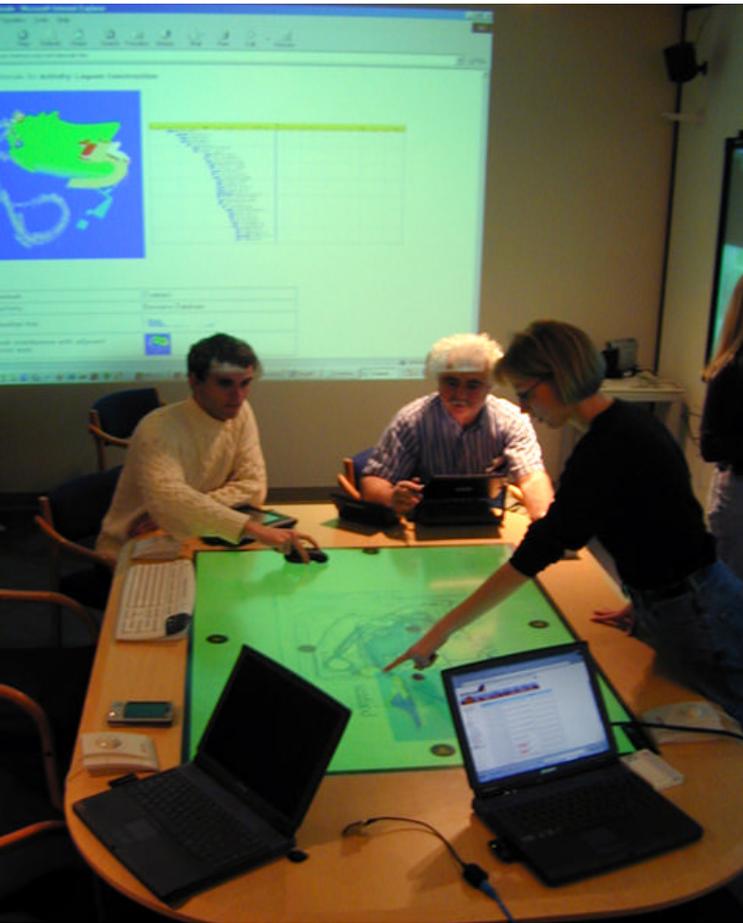
Image and virtual colonoscopy concept courtesy Sandy Napel, Stanford Radiology Department.

Projectors: 1024x768, 900 ANSI Lumens

Mural: 6' x 2', 4096 x 1536, ~60dpi,



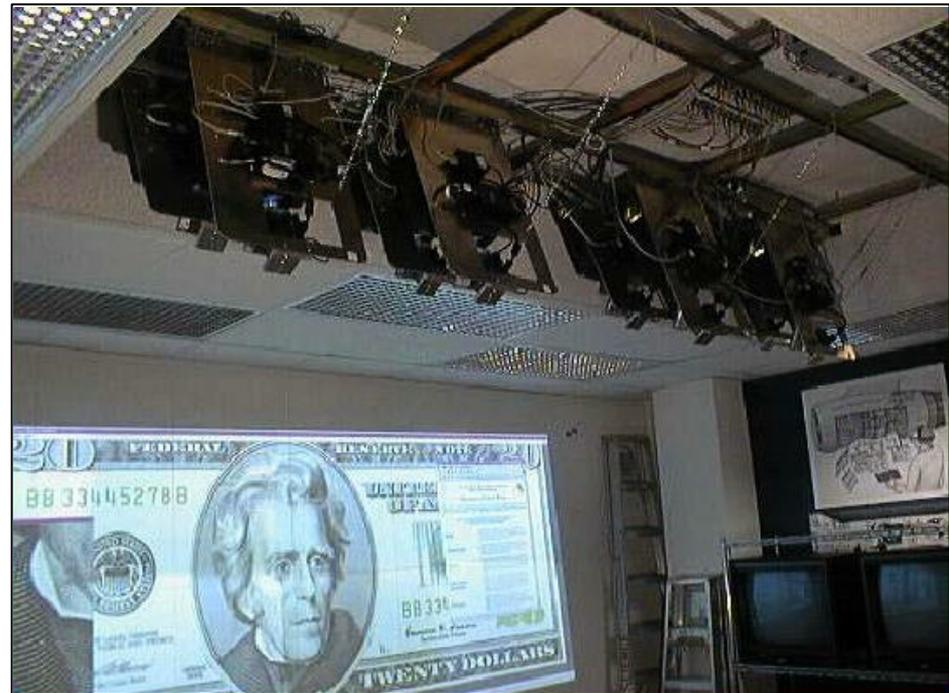
Project Discussion (Stanford)



Rear or Front Projection



Princeton



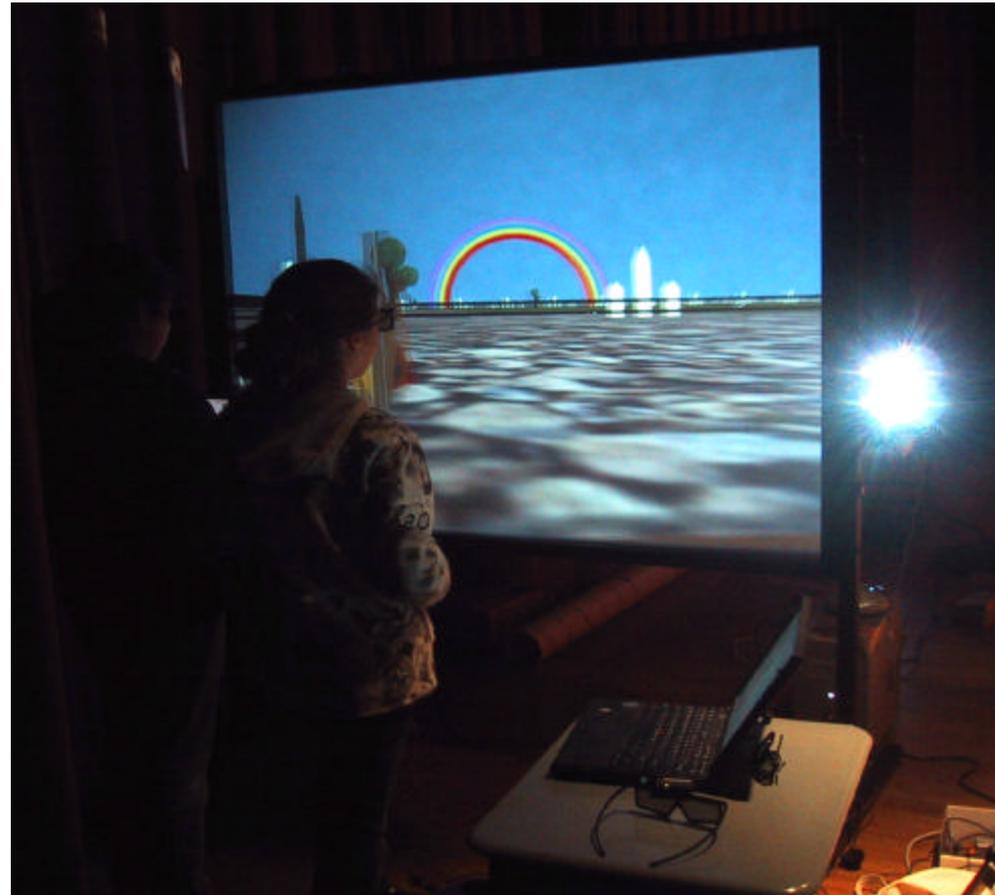
UNC Chapel Hill

AG Technology Integration

- Tiled Display Integration
 - NCSA (Semaro), ANL (Papka, et. al.)
- 3D/VR visualization integration with AG
 - EVL (DeFanti, Leigh), BU (Bresnahan)
- Spatialized Audio
 - Brown (Fulcomer)
- Vtk based Visualization Platform
 - LANL (Ahrens), ANL (Papka, et. al.)
- Distributed Movie Maker
 - LCSE (Woodward)

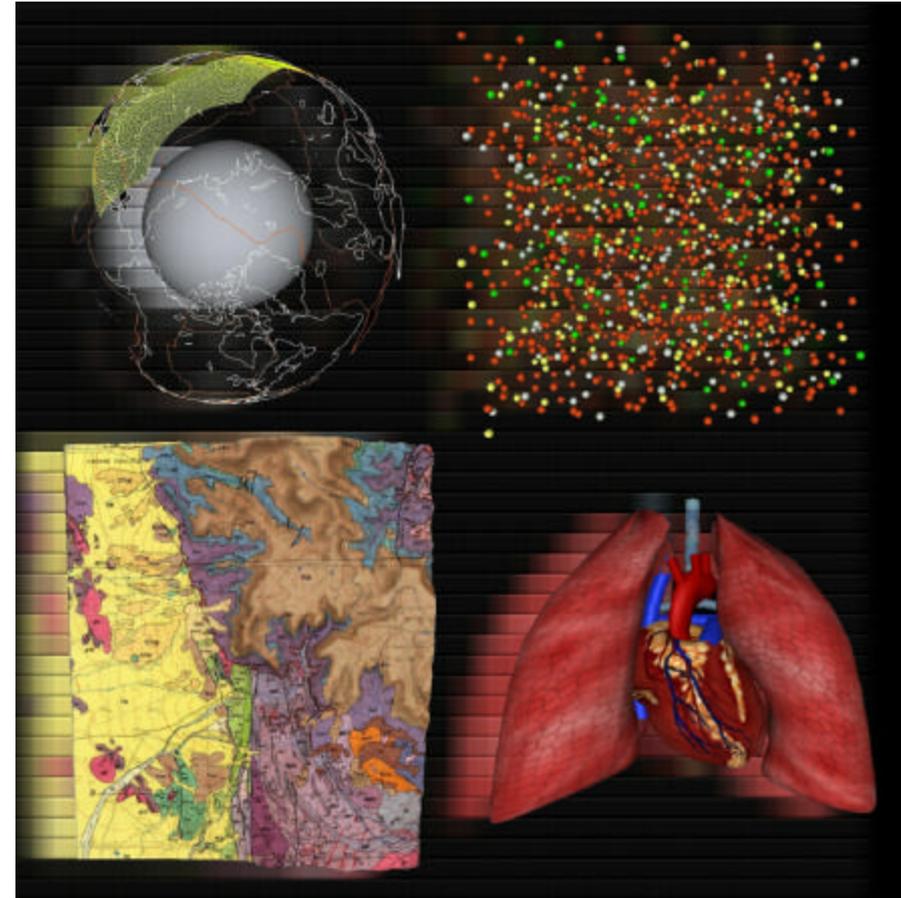
GeoWall (EVL)

- Low cost passive stereo for Geosciences research and teaching
- Working with U of Michigan, U of Minnesota, US Geological Survey, UIC Earth and Environmental Science, and others
- Also in use at SciTech Museum in Aurora and Abraham Lincoln Elementary School in Oak Park



TeraVision (EVL)

- Specialized hardware for streaming graphics over GigE.
- Takes VGA or DVI plug as input, digitizes it at 1024x768 @ 30fps and streams it to remote sites for viewing.
- Can be ganged and synched to stream an entire tiled display.
- Demo at IGrid streams from Greece to Amsterdam and EVL to Amsterdam.



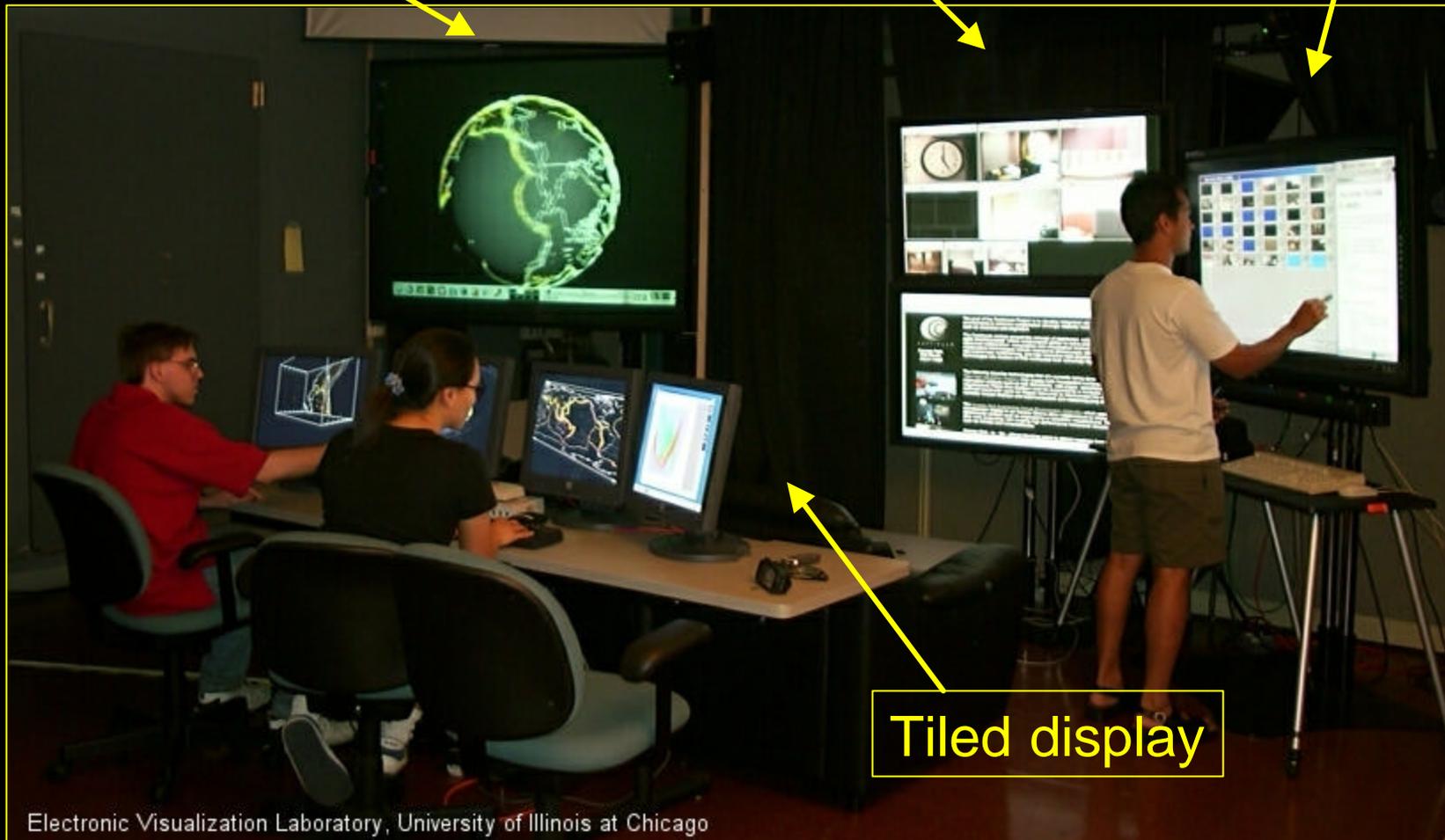
The Continuum at EVL and TRECC

Amplified Work Environment

Passive stereo display

AccessGrid

Digital white board



Tiled display

Emergence of Smart Space Technologies

- Platforms for Grid applications development are expanding
 - PC \Rightarrow Laptop \Rightarrow PDA \Rightarrow Wearable \Rightarrow Ingestible \Rightarrow Implantable
 - PC \Rightarrow Cluster \Rightarrow App specific Cluster \Rightarrow Embedded Clusters
 - PC \Rightarrow Game Console \Rightarrow Clusters of Game Consoles
 - PC \Rightarrow Deskside \Rightarrow Room Oriented \Rightarrow Building Oriented
 - PC \Rightarrow Laptop \Rightarrow Application Appliance \Rightarrow Smart Tool Box
 - PC \Rightarrow Laptop \Rightarrow Embedded \Rightarrow Augmented Reality
- Many edge devices in future environments will not be PCs
- Rooms are becoming systems (AccessGrid)
- Spaces are becoming applications platforms



Enabling User Centered Grids

- Enabling end users to assemble collections of resources and share them within virtual communities
 - Applications Sharing
 - Data (Content) Sharing
 - CPU and Storage Sharing
- Transparent integration with existing user environments
 - Virtual installation of applications in parallel with personal installs
 - Virtual resources appear local
 - iMac storage for example
- Integration with dominate end user technologies
 - Microsoft XP etc.
 - Globus, etc.



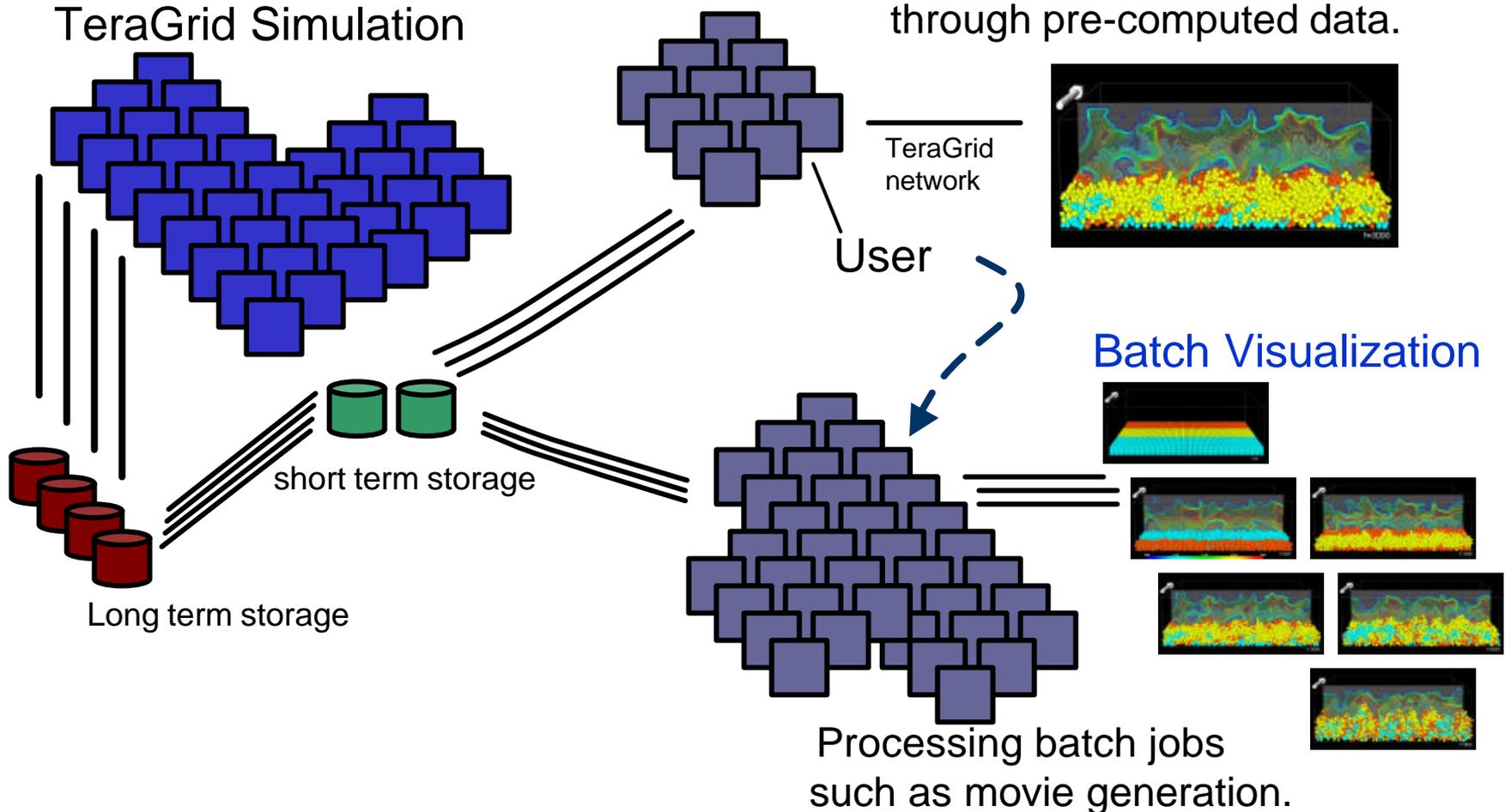
Virtualization of Ubiquitous Infrastructure

- Grids for embedded computing technologies
 - Simpler Grid-like protocols that fit in small memories
 - “Grid on a Chip”
 - Client-Server → Sensor–Server–Client
- Personal Grids
 - Home based media hubs → home grids
 - Spontaneous integration of personal devices
 - Gateways to Family Grids and Professional Grids

Two Types of Loosely Coupled Visualization

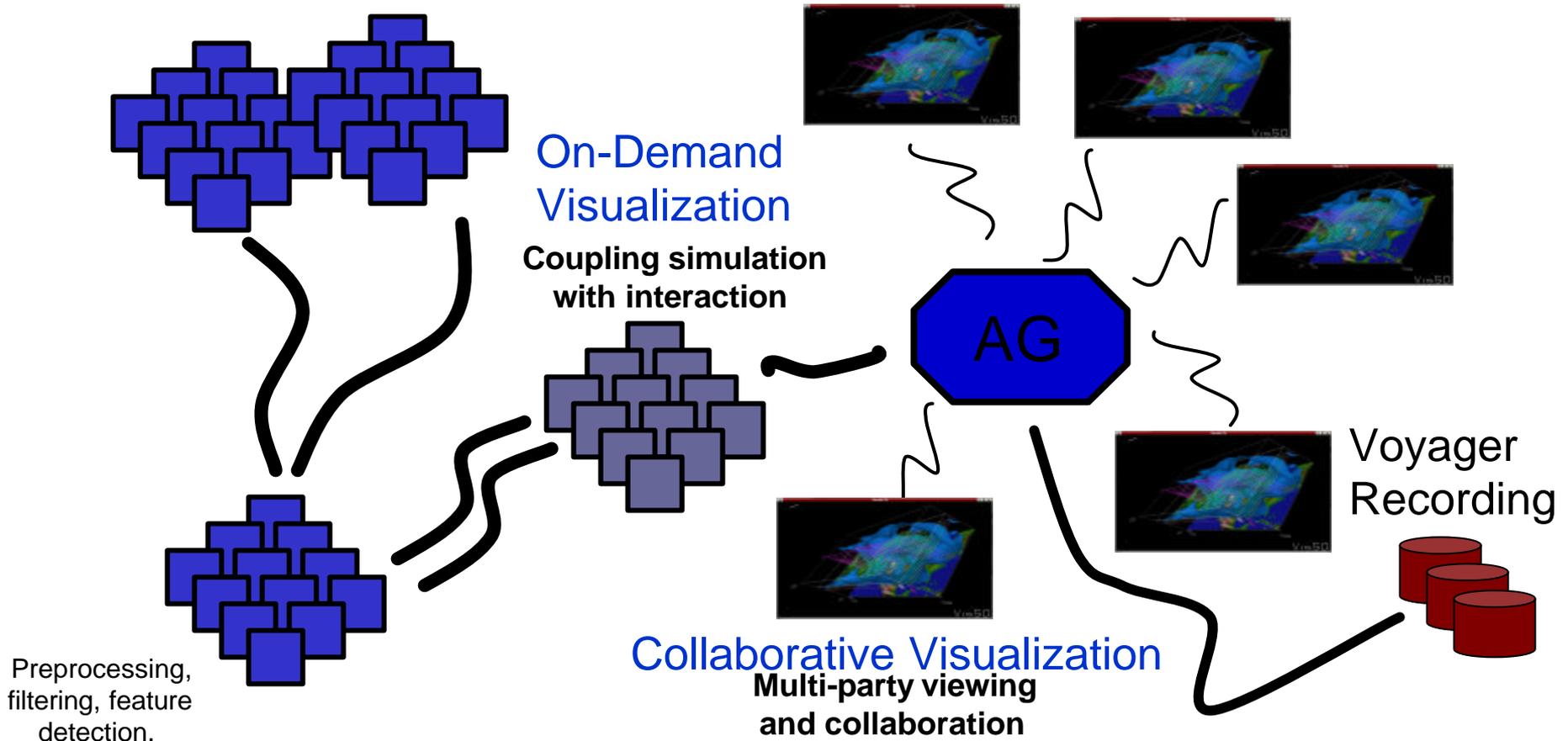
Interactive Visualization

Computationally steering through pre-computed data.



On-Demand and Collaborative Visualization

TeraGrid Simulation



Preprocessing,
filtering, feature
detection.

On-Demand
Visualization

Coupling simulation
with interaction

AG

Collaborative Visualization

Multi-party viewing
and collaboration

Voyager
Recording

Survey Questions

- How many people are interested in a Mac port of AG2?
- How many people here don't yet have AG installations but are interested in setting them up ?
- How many people are interested in developing services or applications for AG2?

Input and Upcoming Events

- GG8 Seattle end of June
 - Tutorial on AG2
 - ACE research group meeting
 - WACE conference
- SC Global 2003
 - @ SC2003
- AG Retreat next year
 - Toronto May 17-19th or June 7-9th
 - Introducing a AG celebration and technology fest
- GGF10 in Germany, Frankfurt in March
 - One day Euro-AG meeting

Thanks..

- Mike Papka
- Justin Binns
- LaJoyce Bullock
- Mary Fritsch
- Ti Leggett
- Jennifer Teig von Hoffman
- Cheryl Zidel

- FL crew

- Insors Communications for the cool shirts

- ANL and APS

Future Embedded Processor Based Products

- Personal Bio-hazard Protection System
 - Artificial Immune System Sensory System
- Mood Monitor and Personal Drug Delivery system
 - Implantable Pharmacopoeia
- Object History Modules
 - Manufacturing data about and life-history of the object
- Smart Food containers
 - Environmental history and dynamic monitoring of contents
- Child Tracking and Safety System
 - locator and communications etc.

