

RIT Global Collaboration Grid



RIT Global Collaboration Grid



A global infrastructure for interactive multipoint collaboration



A connected virtual community showcasing the innovation & creativity of RIT, its partners and sponsors



A student research platform for innovative technologies and advanced collaborative applications



Current Node Locations

Public CyberPortals

National Technical Institute for the Deaf Video Wall

Wallace Center Library

Saunders College of Business Atrium

Alumni Relations Video Wall

American University of Kosovo

Transmit-only nodes

Global Village

Semiconductor Micro Fabrication Laboratory Clean Room

Computer Engineering VLSI Laboratory

Departmental, Lab nodes

Center for Student Innovation

Research Computing Laboratory

Golisano Computing College/NTID Laboratory

NTID Research Self-Instruction Laboratory

Golisano PhD Program

Biomedical Photography Laboratory

American College of Management and Tourism
Overview Dubrovnik, Croatia

Nodes in-progress

Rochester General Health Systems

University of Rochester

Gallaudet University Washington, D.C.



Critical Features

Free software

High quality video and audio streams

Scalable participants from one to many (hundreds)

Open source for tailoring to individual requirements



Showcases RIT Students

- Being built by students who are part-time, co-ops, international, and deaf/hard of hearing
- Being built by former students as temps and full-time staff
- Leverages the expertise of the Research Computing Lab



Showcases RIT's Partners

- University of Rochester



- Rochester General Health Systems



- Gallaudet University



- NIH/NLM



Showcases RIT's Sponsors



Enables Advanced Applications

- Telemedicine
- Global Education
- Cultural Exchanges
- Alumni Events
- Research Collaborations
- Music and Theater
- Business Meetings
- NTID Events
- Student Collaborations

Telemedicine

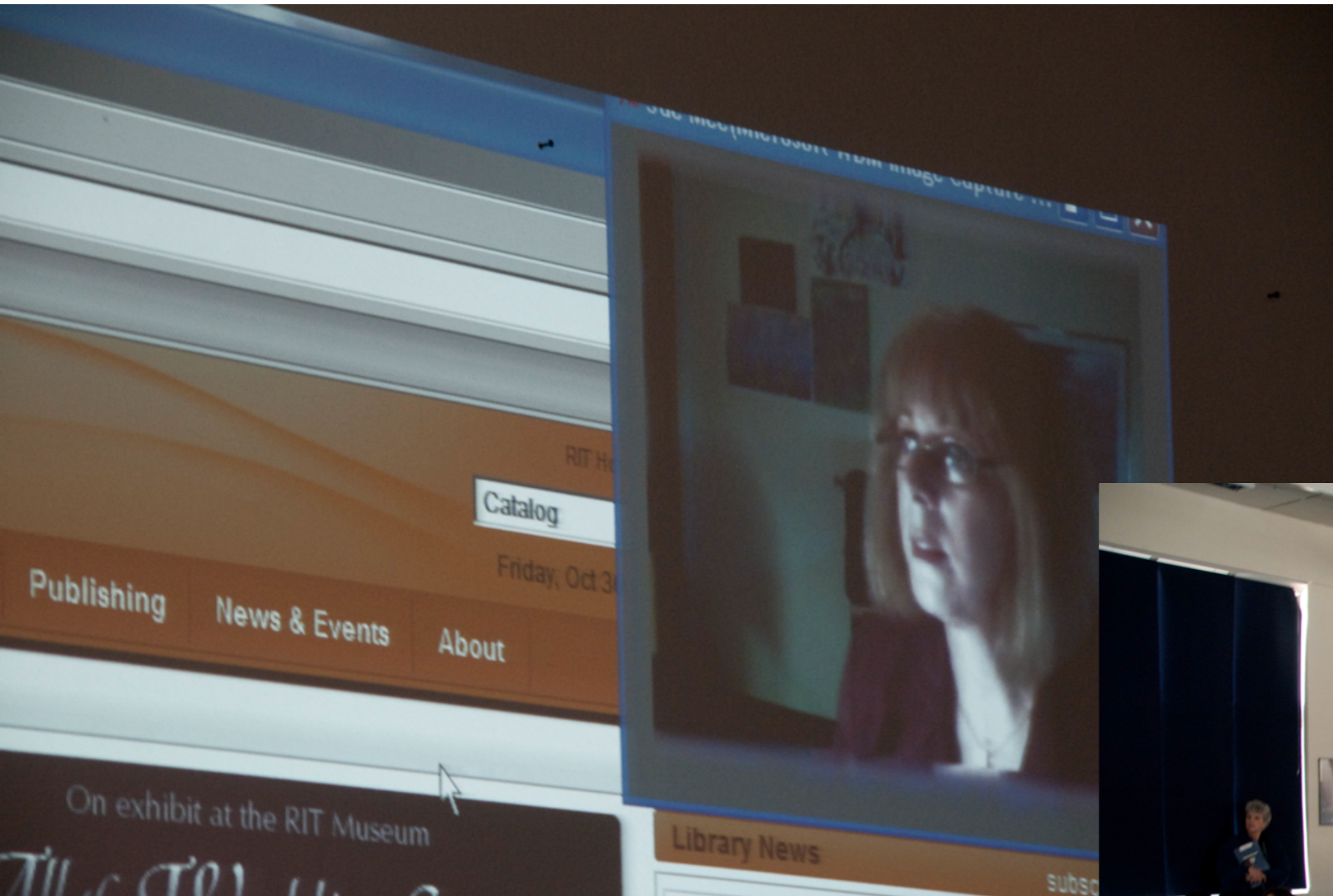
University of
Puerto Rico
Medical School

Live Endoscopy
Procedure

Transmitted to
RIT, Johns
Hopkins,
University of
Michigan



Distance Learning



Librarian at the RIT
Wallace Center



Students at the American
University of Kosovo



Research Collaborations

Live interview
with RIT CS
Faculty and
Student to NSF
Headquarters in
VA

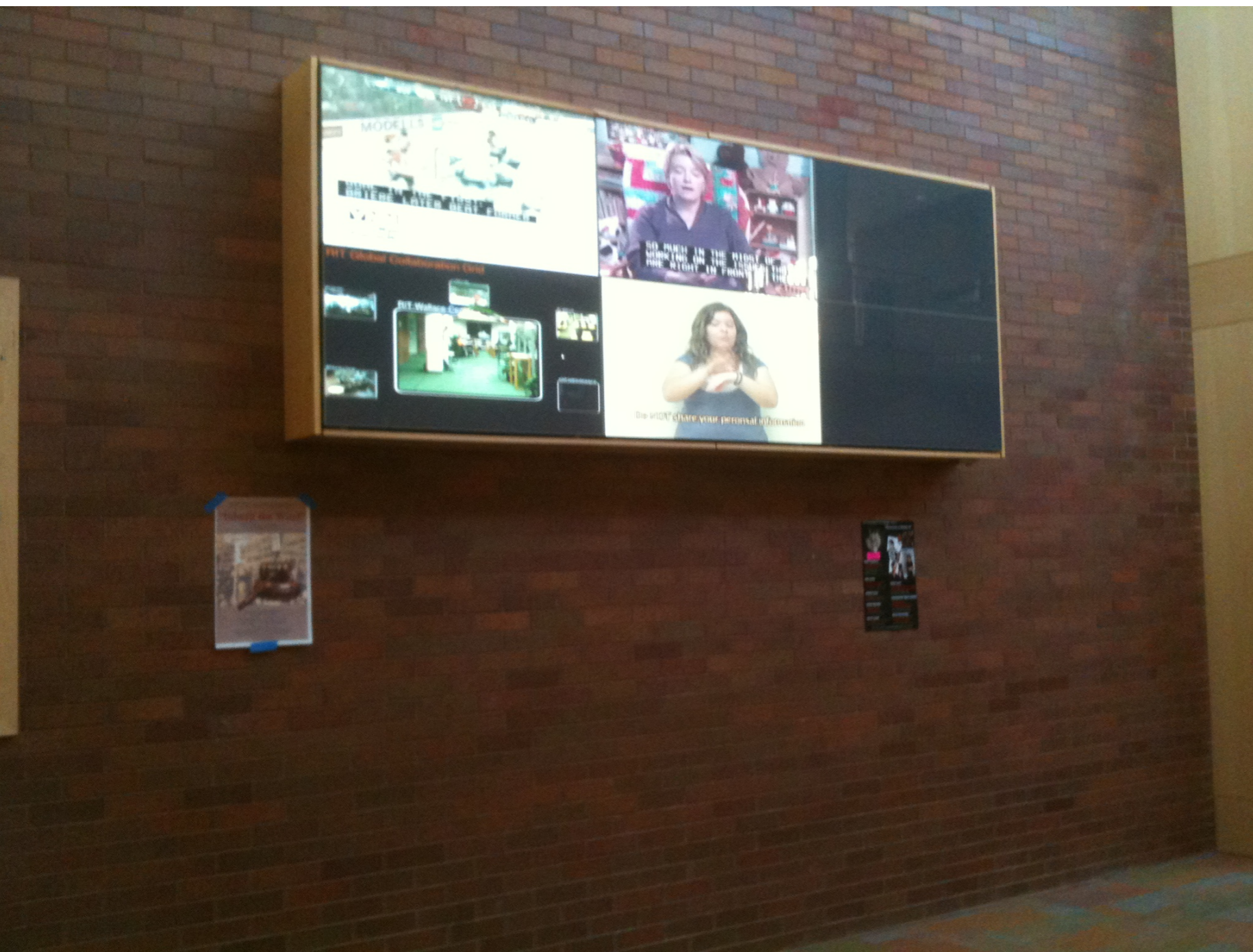


Theatrical Performances

Backchannel
control system
for Virtual
Theatre
presentation
(RIT CS, Design)



Building Connected Communities



Connecting deaf/hard of hearing RIT students to Gallaudet University and other sites

Alumni Mentoring



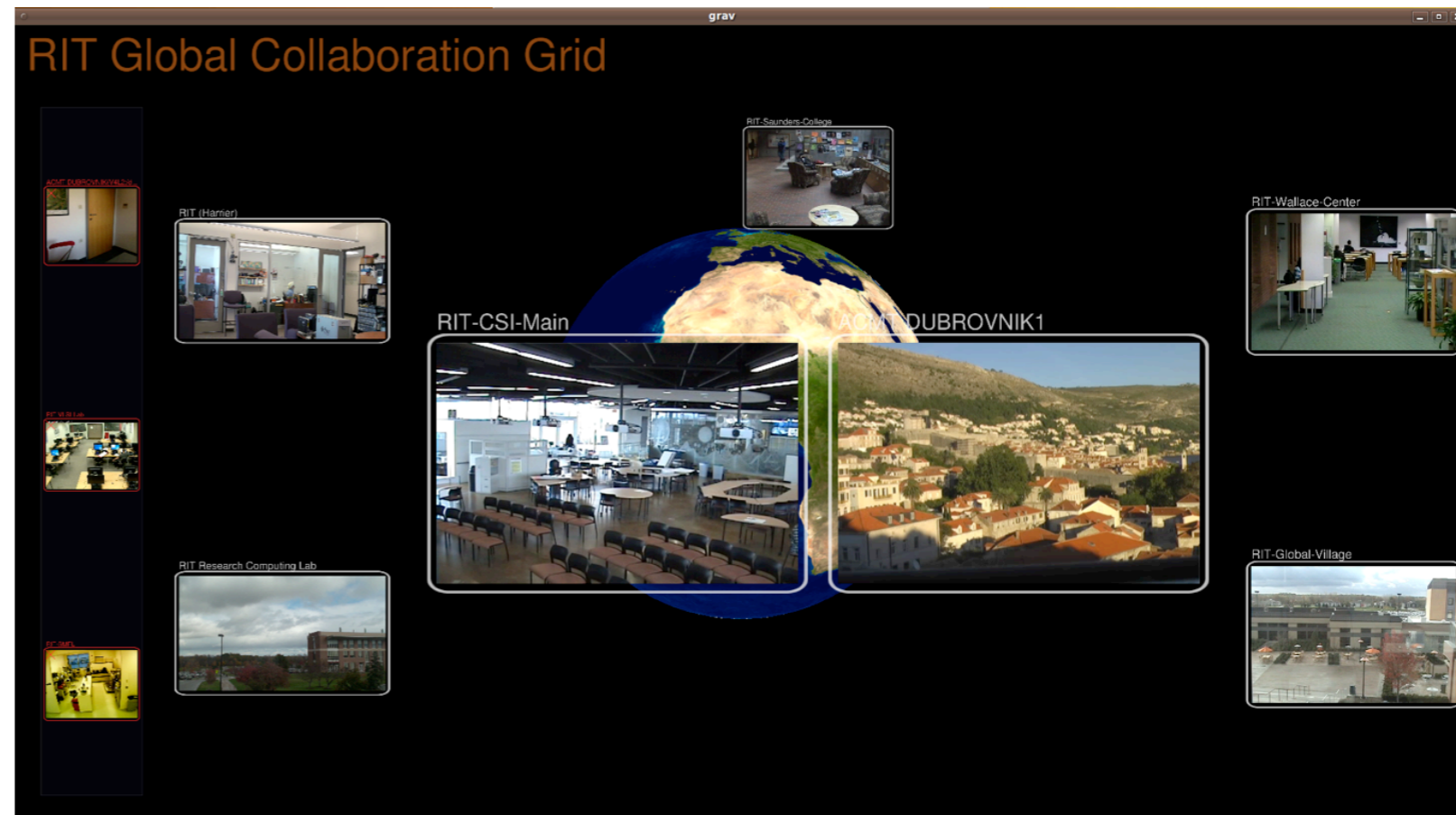
RIT Alumna at IBM signing with RIT and University of Washington students and staff

R & D Areas

- User Interface
- Compression Codecs
- Camera & Computer Hardware
- Network Transport
- Global Architecture
- Accessibility

User Interface - software

- **grav**--original RIT code released as GPL
- GL based
- viewer for RTP streams
- multistream handling
- multivenue aggregation
- venue switching



grav stream aggregation

grav

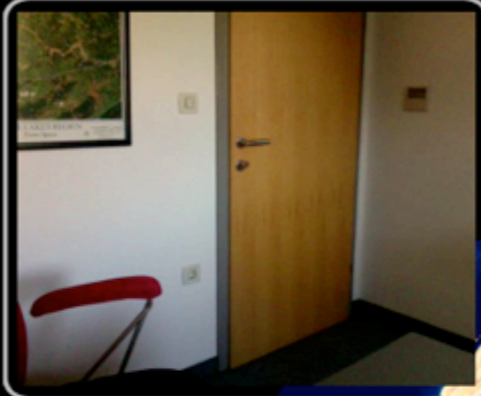


RIT Global Collaboration Grid

RIT (Harrier)



ACMT DUBROVNIK(V4L2:/d...



RIT-Saunders-College



RIT-SMFL



ACMT DUBROVNIK1



RIT-Wallace-Center



RIT-Global-Village



RIT-CSI-Main



RIT-VLSI-Lab



RIT Research Computing Lab



grav "telepresence"



HD (1920x1080) H.264 30 fps 5-50 Mbps



User Interface - hardware

- Gestural user controls
- Multitouch user controls
- Video Wall systems
- Public Kiosk systems
- Telepresence systems
- Mobile systems
- Audio in public spaces
- Spatial Audio Privacy

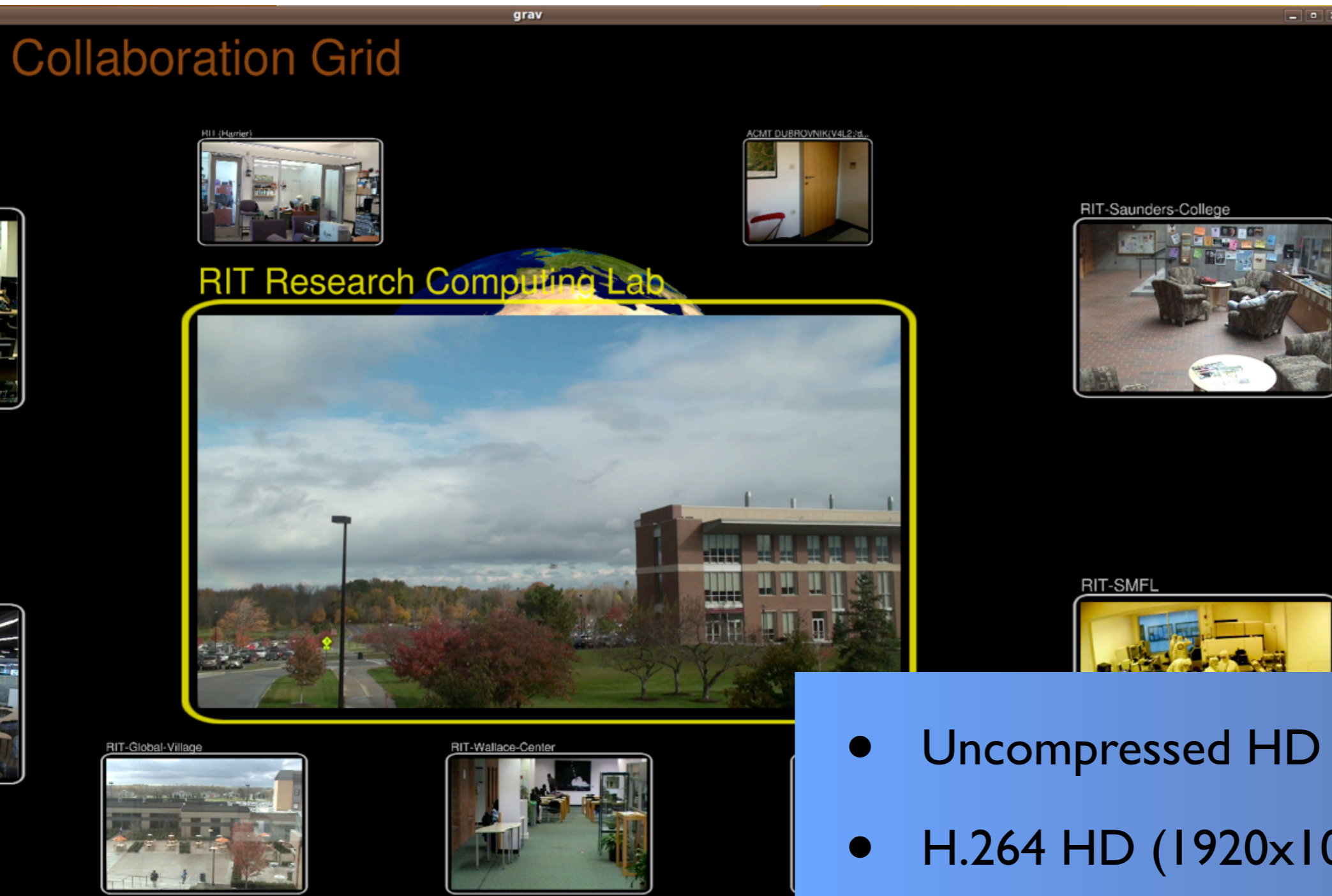
Video Wall Displays

- Tiled displays of many panels, either LCDs or Projection
- Able to scale to many streams while retaining quality
- Immersive experience is high impact
- SAGE video wall project

Gestural and Multitouch Displays

- Gestural, multitouch, and kiosk interfaces
- Adaptation of 'grav' to multitouch control
- Kinect experiments with integration
- Display replication for kiosks, viewer devices

Video Formats



- Uncompressed HD video and audio
- H.264 HD (1920x1080)
- Uncompressed 4K Video (3840x2160)

Camera & Computer Hardware

- HD camcorder for high definition at 1920x1080i
- Blackmagic Design PCI capture card for HDMI input
- Octo core PC with DVI out
- Gigabit ethernet
- Ubuntu Linux

Network Transport

- RTP
- Multicast
- Bridging
- Security
- Camera Output
- Packetization
- Performance
- Jumbo frames
- IPv6
- Fiber

Global Architecture

- How to deploy & maintain
- Thin clients and HPC servers
- Head-end processing station
- Appliance-like clients
- International Networks



Accessibility

esp. Deaf/Hard of Hearing

- Real-time captioning (automatic)
- Video specs for hand signing
 - frame rate
 - shutter speed
 - resolution
 - composition
 - color/sharpness
- Privacy



Non-technical Challenges

- Space
- Equipment
- ISPs
- Support
- Accountability
- Priority
- Collaboration
- Funding
- Champion
- Applications



Staff of the Interactive Collaboration Laboratory

Gurcharan S. Khanna, Director

Director of Research Computing
Office of the Vice President for Research

Andrew Ford, ICELab Manager

3 student co-op positions