Calit2's UCSD Building – A "Living Laboratory" For The Future

Overview

Gilbane Higher Education Facilities Forum

UC San Diego

October 7, 2007

Dr. Larry Smarr and Dr. Ramesh Rao

Director and UCSD Division Director, California Institute for Telecommunications and Information Technology

UCSD UCIrvine

it²

Calit2 Continues to Pursue Its Initial Mission:

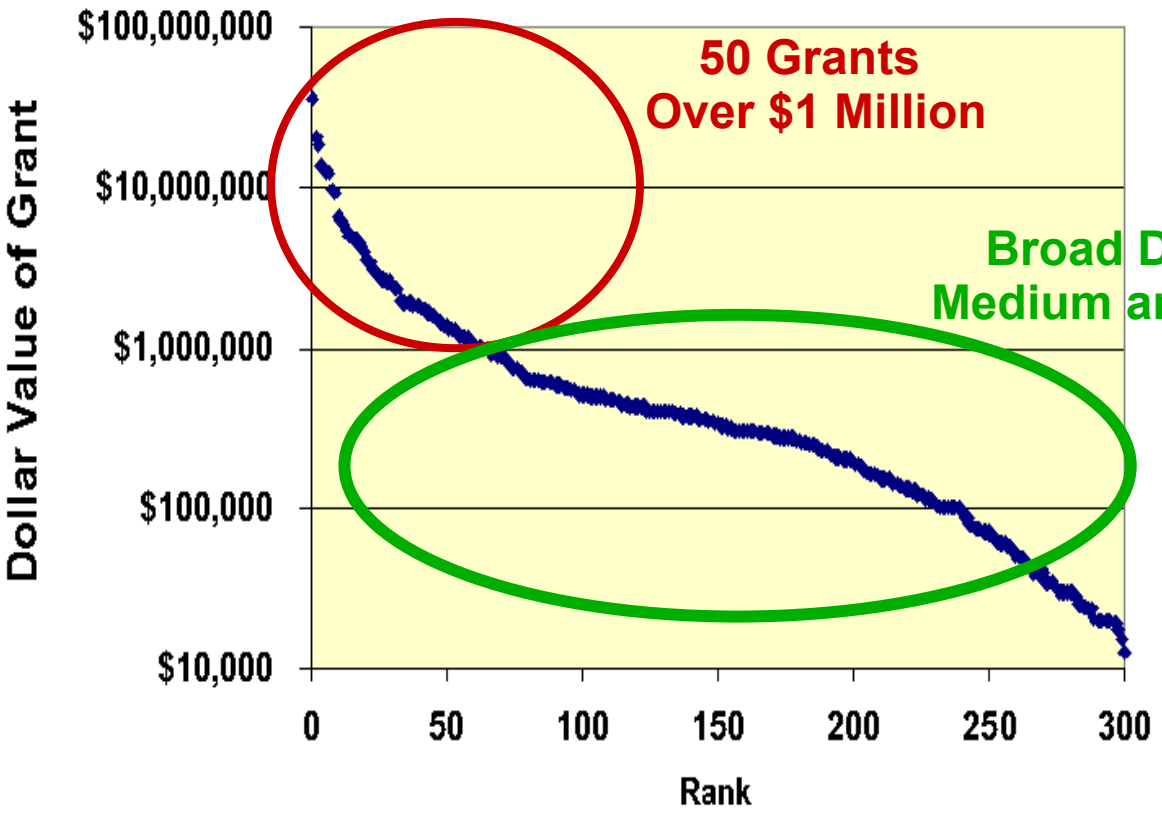
Envisioning How the Extension of Innovative Telecommunications and Information Technologies Throughout the Physical World will Transform Critical Applications Important to the California Economy and its Citizens' Quality Of Life.

Calit2 is a University of California "Institutional Innovation" Experiment on How to Invent a Persistent Collaborative Research and Education Environment that Provides Insight into How the UC, a Major Research University, Might Evolve in the Future.

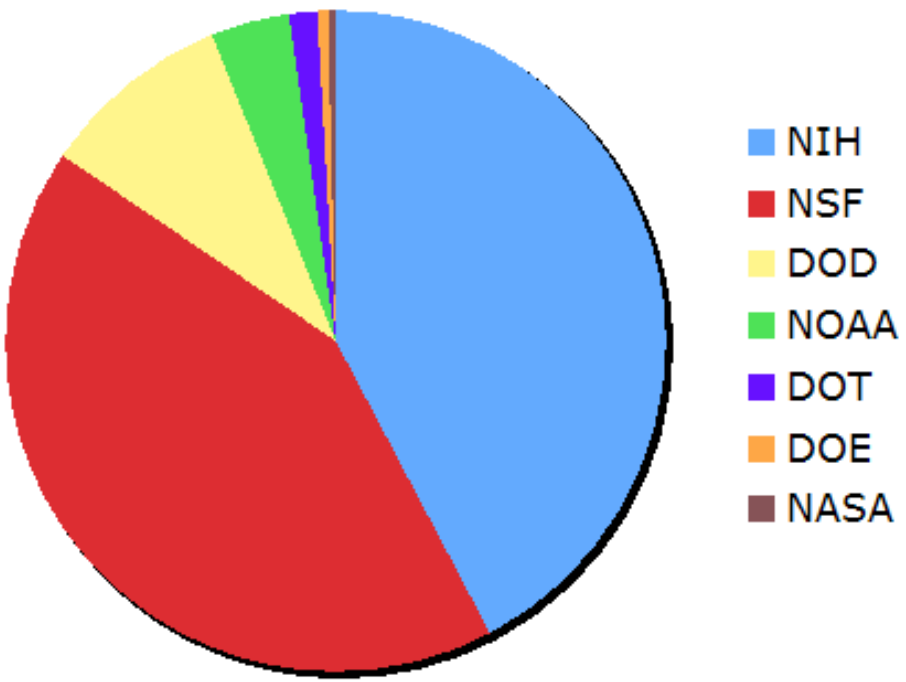
UCSD
UCIrvine

it²

Federal Agencies Have Funded $350 Million to Over 300 Calit2 Affiliated Grants



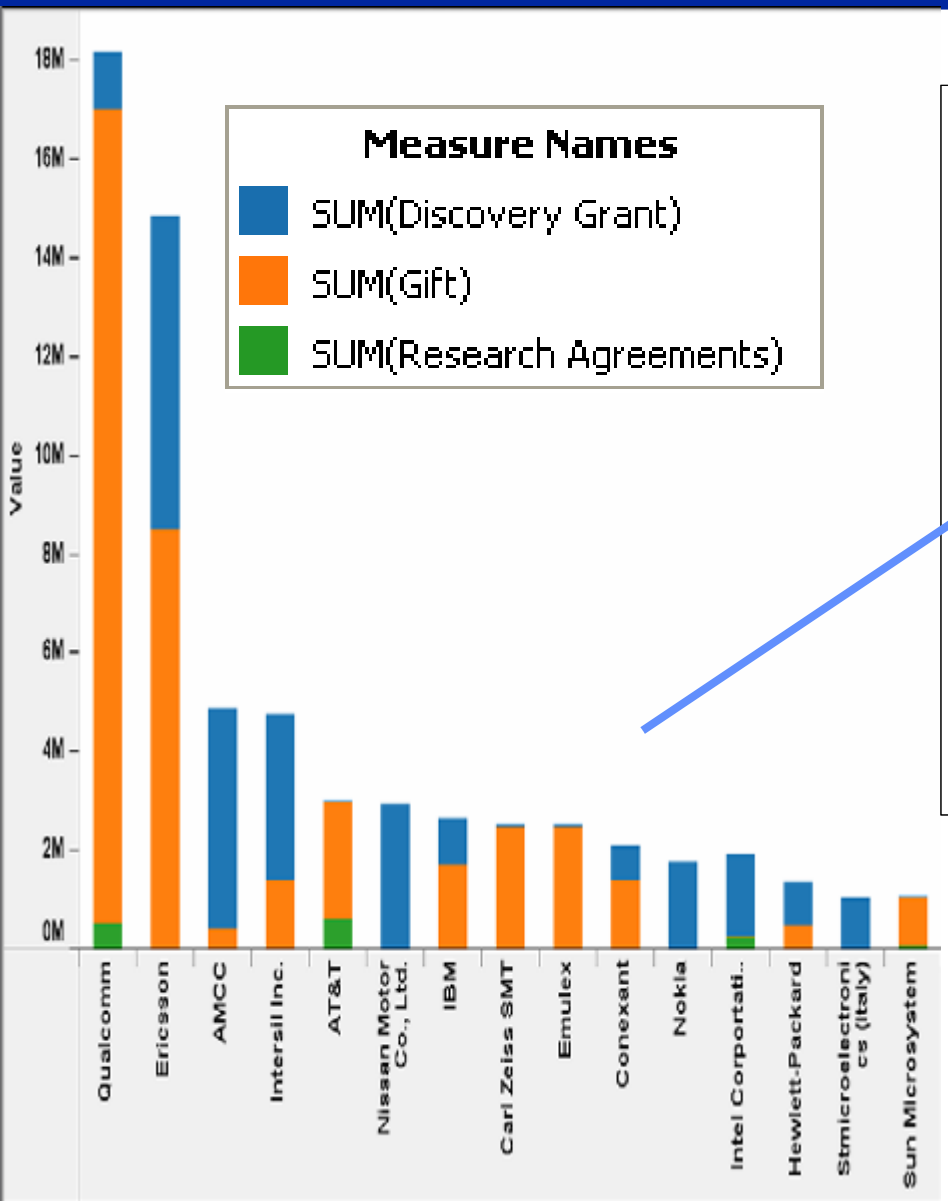
Creating a Rich Ecology of Basic Research



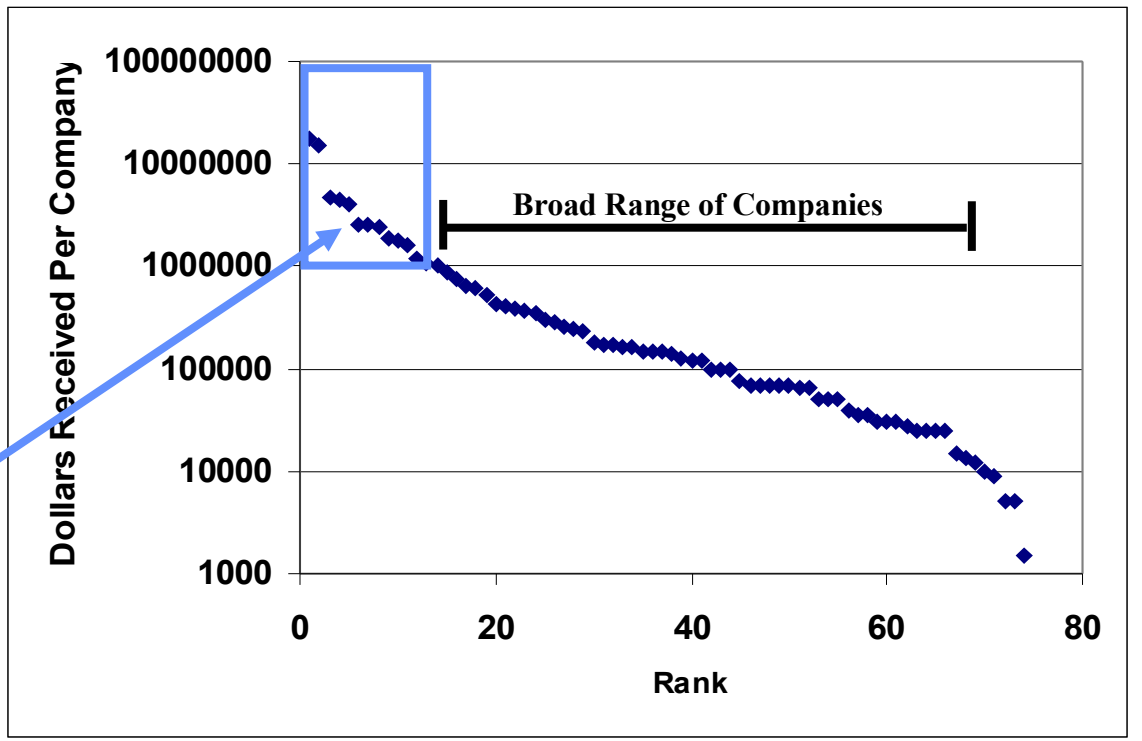
Federal Agency Source of Funds

UCSD
UCIrvine

In Spite of the Bubble Bursting, Calit2 Has Partnered with over 130 Companies



More Than 80 Have Provided Funds or In-kind

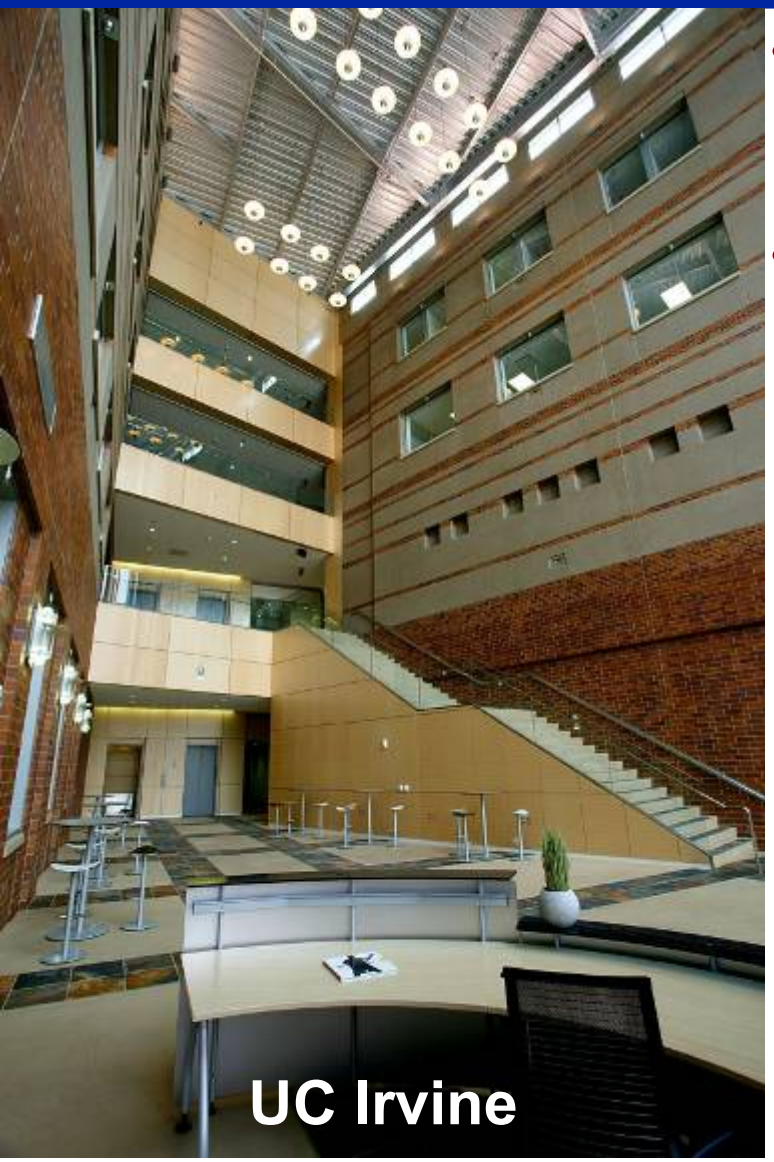


Over $80 Million From Industry So Far

Industrial Partners > $1 Million

UCSD
UCIrvine

Two New Calit2 Buildings Provide New Laboratories for "Living in the Future"



- "Convergence" Laboratory Facilities
  - Nanotech, BioMEMS, Chips, Radio, Photonics
  - Virtual Reality, Digital Cinema, HDTV, Gaming
- Over 1000 Researchers in Two Buildings
  - Linked via Dedicated Optical Networks



www.calit2.net

Preparing for a World in Which Distance is Eliminated…

UCSD
UCIrvine



BY THE *NUMBERS*

- ✓ 98 core staff
- ✓ 150 affiliated faculty
- ✓ 900 peak occupancy

UCSD
UCIrvine

Calit2 is Experimenting with Open Reconfigurable Work Spaces to Enhance Collaboration







UCSD
UCIrvine

Photos by John Durant; Barbara Haynor, Calit2

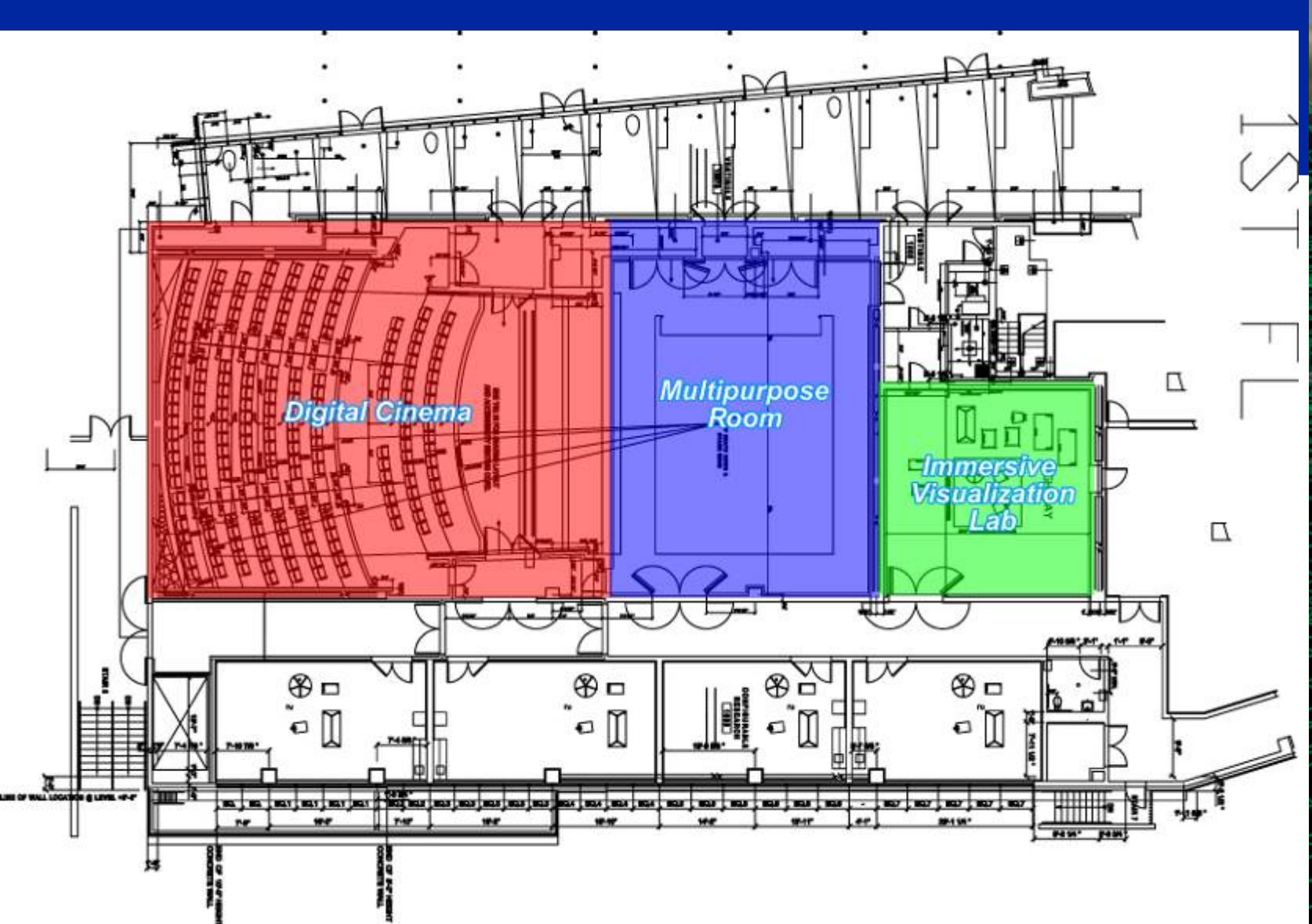
Entertainment Spaces

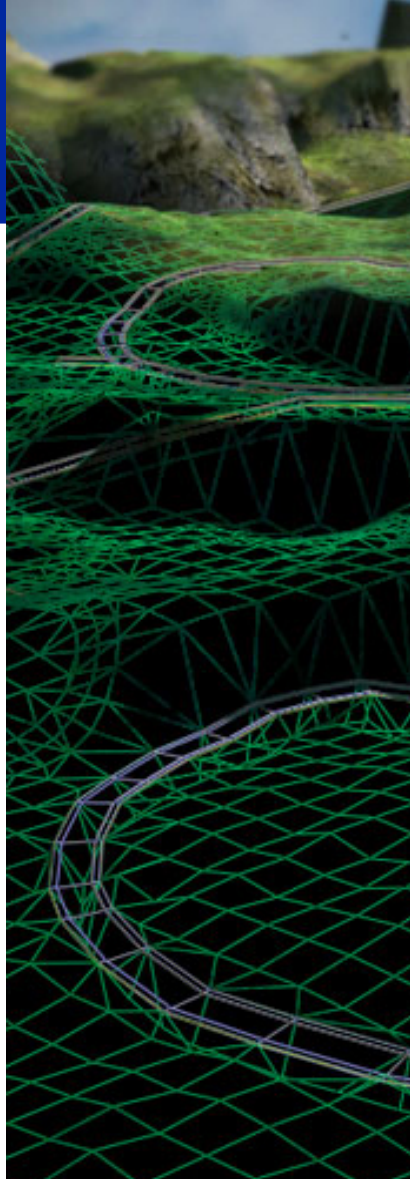
- ✓ Pre-function Area
- ✓ Courtyard





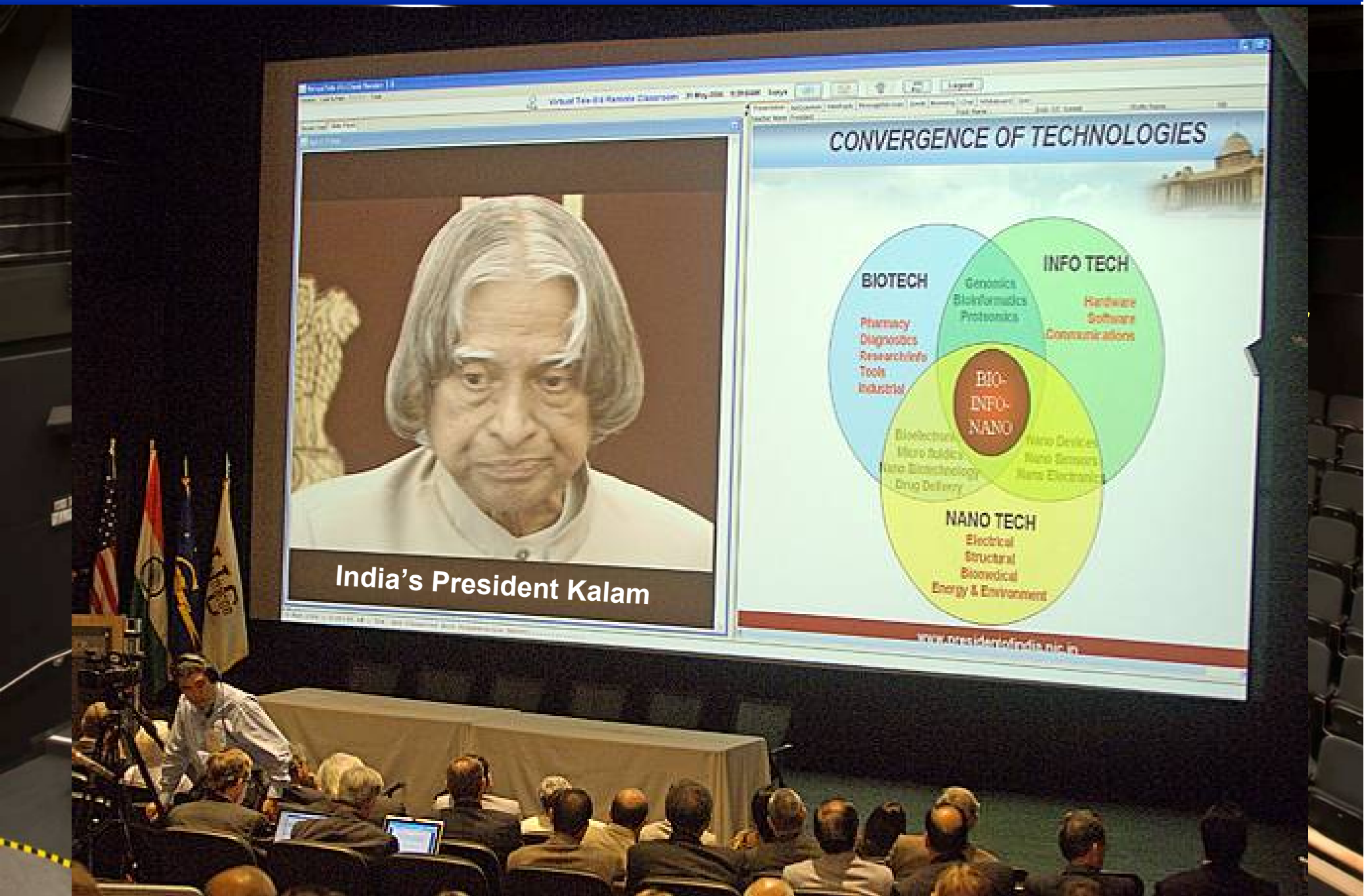
UCSD
UCIrvine





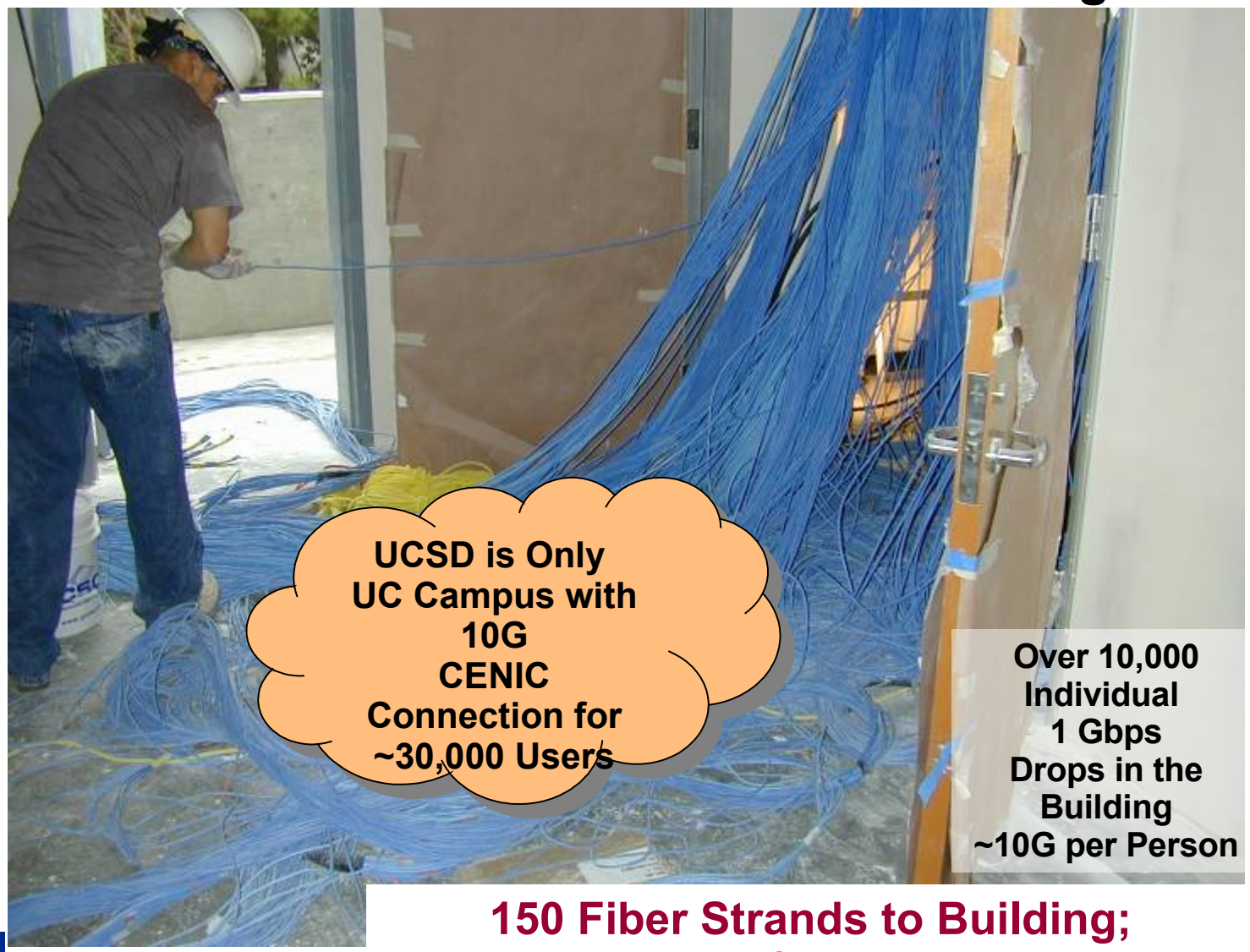
New Media Arts Wing

Building a Global Collaboratorium



The Calit2@UCSD Building is Designed for Prototyping Extremely High Bandwidth Applications

1.8 Million Feet of Cat6 Ethernet Cabling



24 Fiber Pairs to Each Lab

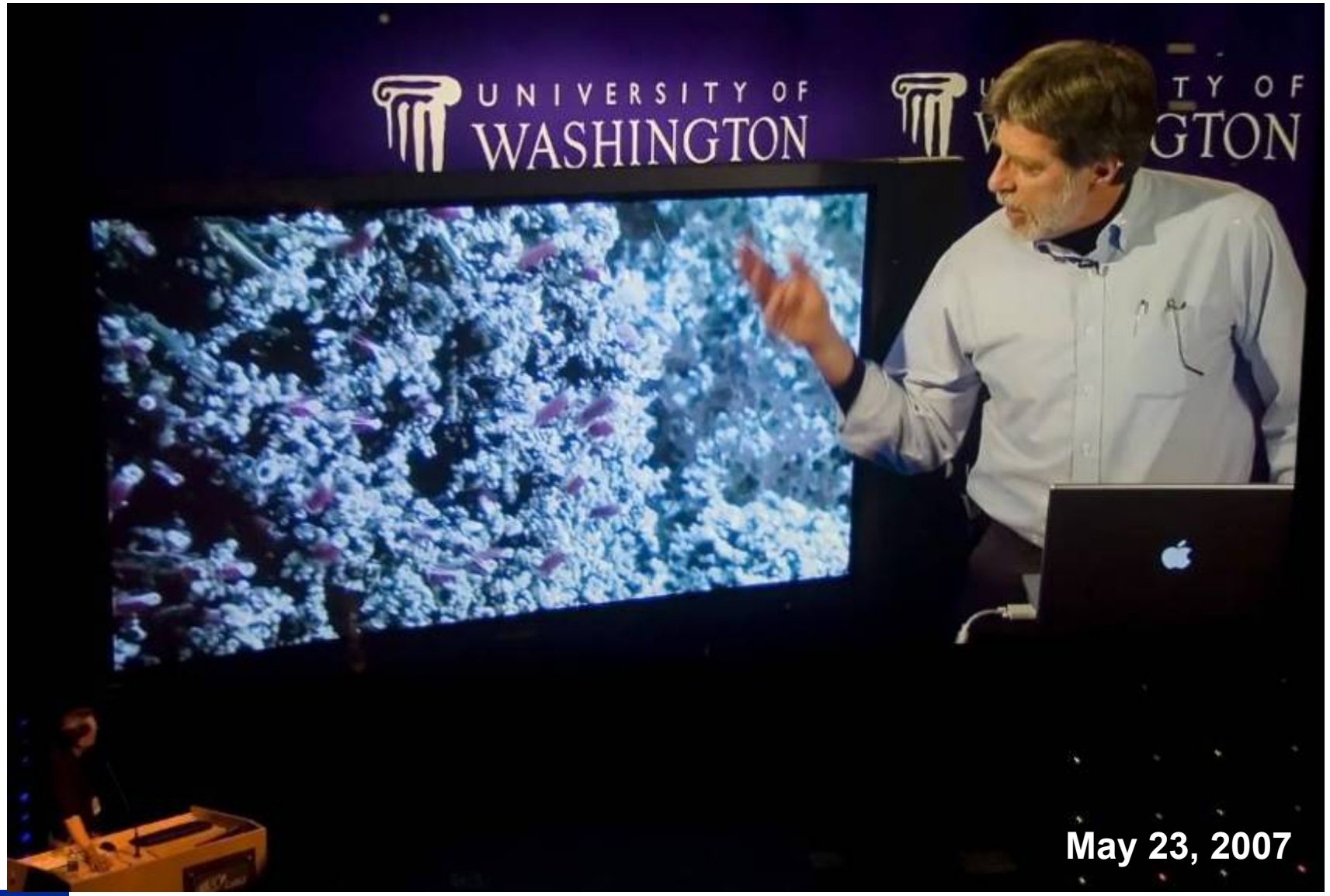
150 Fiber Strands to Building; Experimental Roof Radio Antenna Farm Ubiquitous WiFi

Photo: Tim Beach, Calit2

UCSD
UCIrvine

e-Science Collaboratory Without Walls Enabled by Uncompressed HD Telepresence

1500 Mbits/sec Calit2 to UW Research Channel Over NLR



John Delaney, PI LOOKING, Neptune

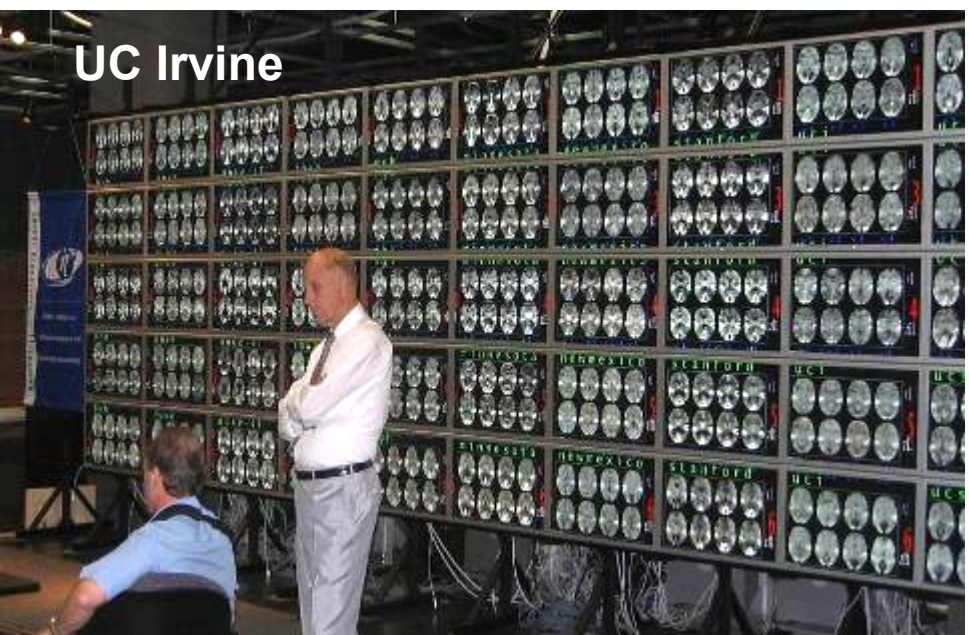
Photo: Harry Ammons, SDSC

UCSD
UCIrvine

Nearly One Half Billion Pixels in Calit2 Extreme Visualization Project!

Connected at 2,000 Megabits/s!







UCI HIPerWall Analyzing Pre- and Post- Katrina

UCSD
UCIrvine

Falko Kuester, UCSD; Steven Jenks, UCI

Multipurpose Room—
A “Black Box” Theatre Space



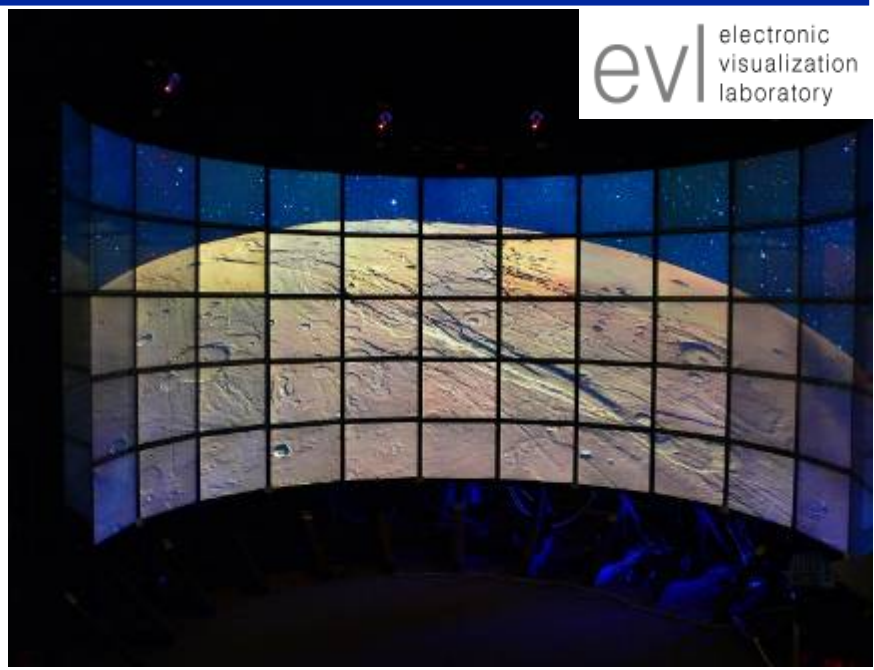
UCSD
UCIrvine

- 100-seat Reconfigurable Space
- Performances/Seminars

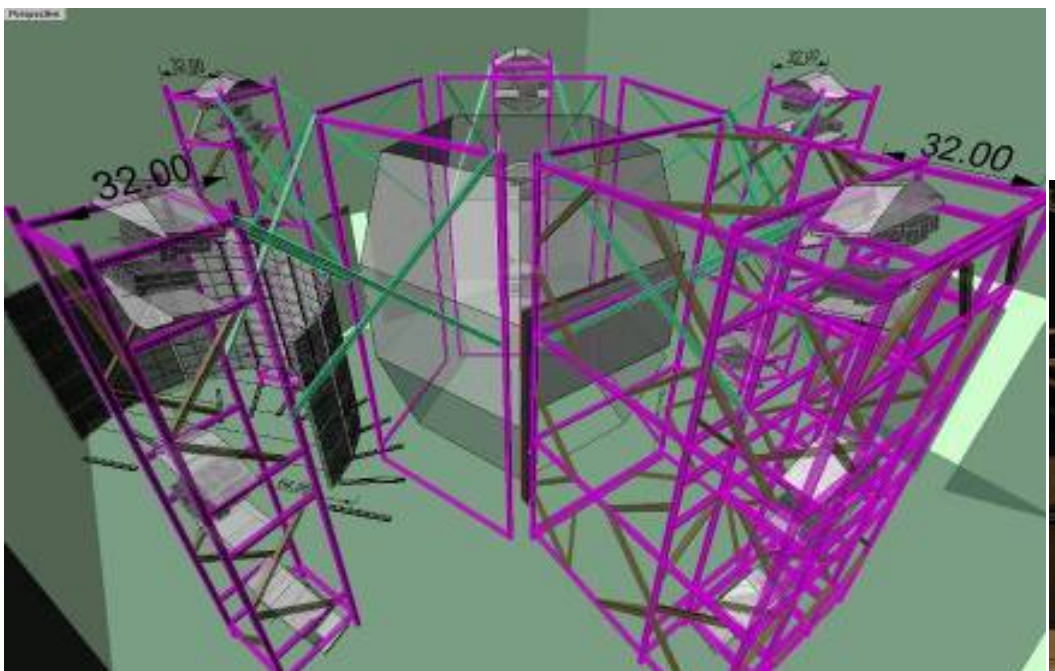
it²

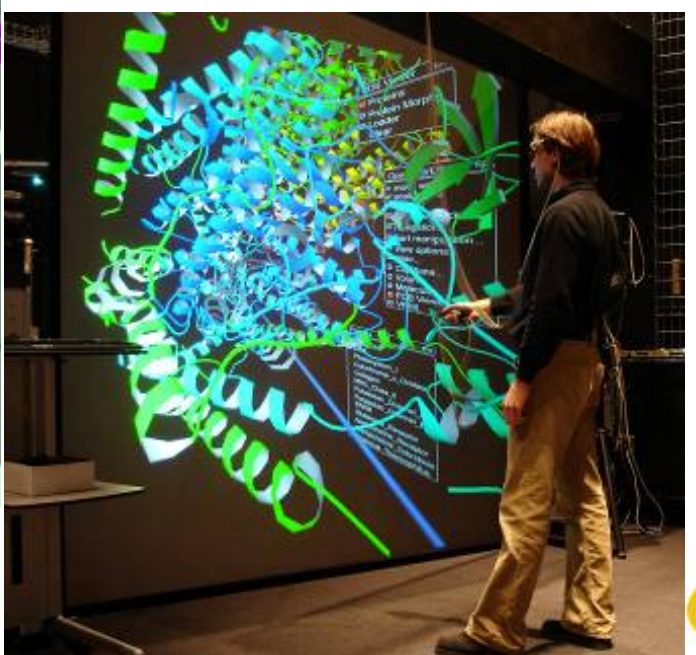
Filling the 30’ x 30’ “Hole” in the Calit2 Building With Next Generation Virtual Reality

- **Varrier Autostereo Virtual Reality**
  - **Head-Tracked No Need for Glasses**
  - **65 High Resolution LCD Tiles**
  - **45 Mpixels/eye of Visual Stereo**
- **StarCAVE**
  - **Six HD Projectors Per Wall**
  - **3200 Times Rendering Speed of a PC!**



evl electronic visualization laboratory



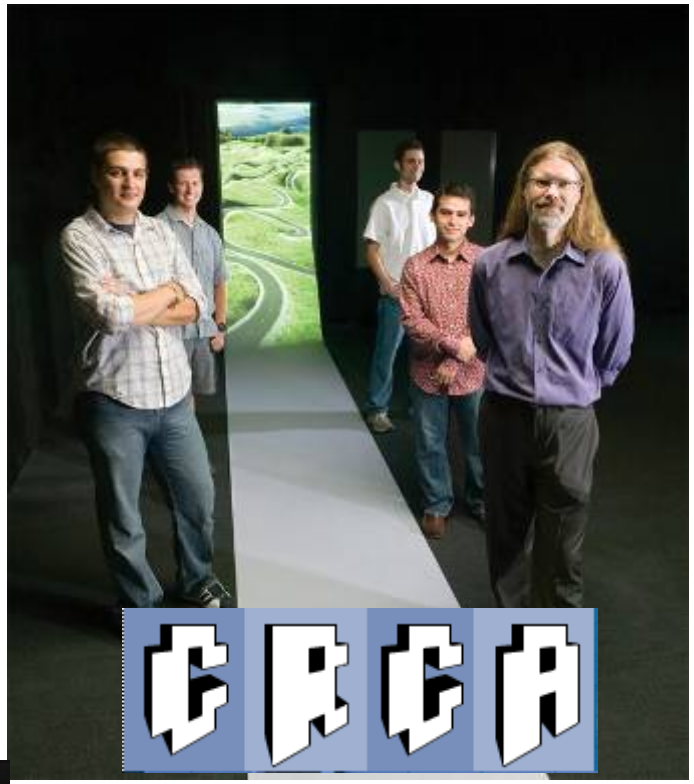


UCSD
UCIrvine

it²

Advanced Multimedia Facilities





- Audio Spatialization
- Motion Capture
- Gaming Lab



High Definition Studio

UCSD
UCIrvine

Calit2 Materials and Devices Laboratory: "Nano3" – Science, Engineering, Medicine



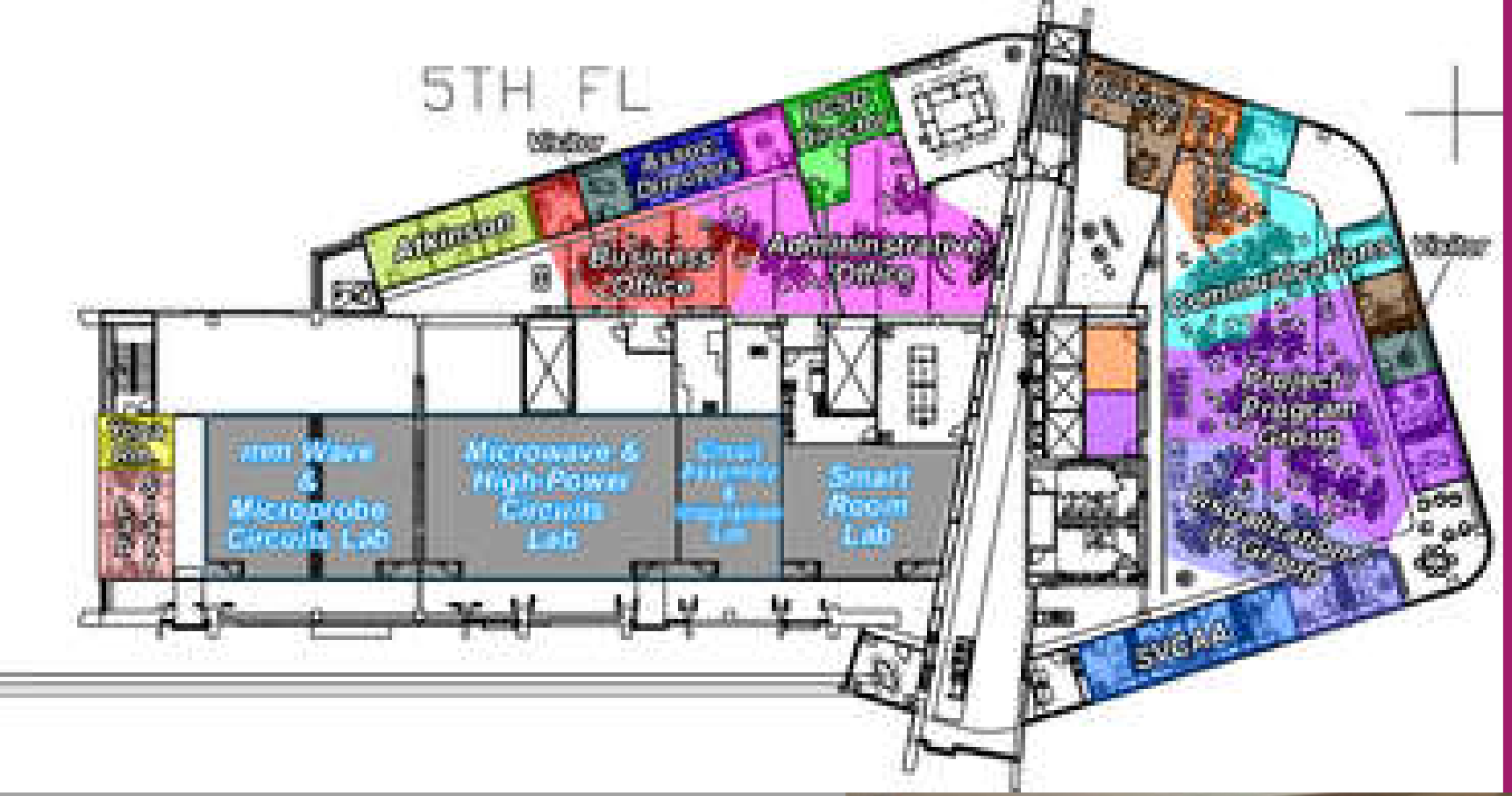
10,000 sq. feet State-of-the-Art Materials and Devices Laboratory



nano3
SCIENCE ENGINEERING MEDICINE

http://nano3.calit2.net/

Source: Bernd Fruhberger, Calit2



Laboratories

- ✓ Millimeter Wave
- ✓ Microwave/PA
- ✓ Circuits
- ✓ Photonics



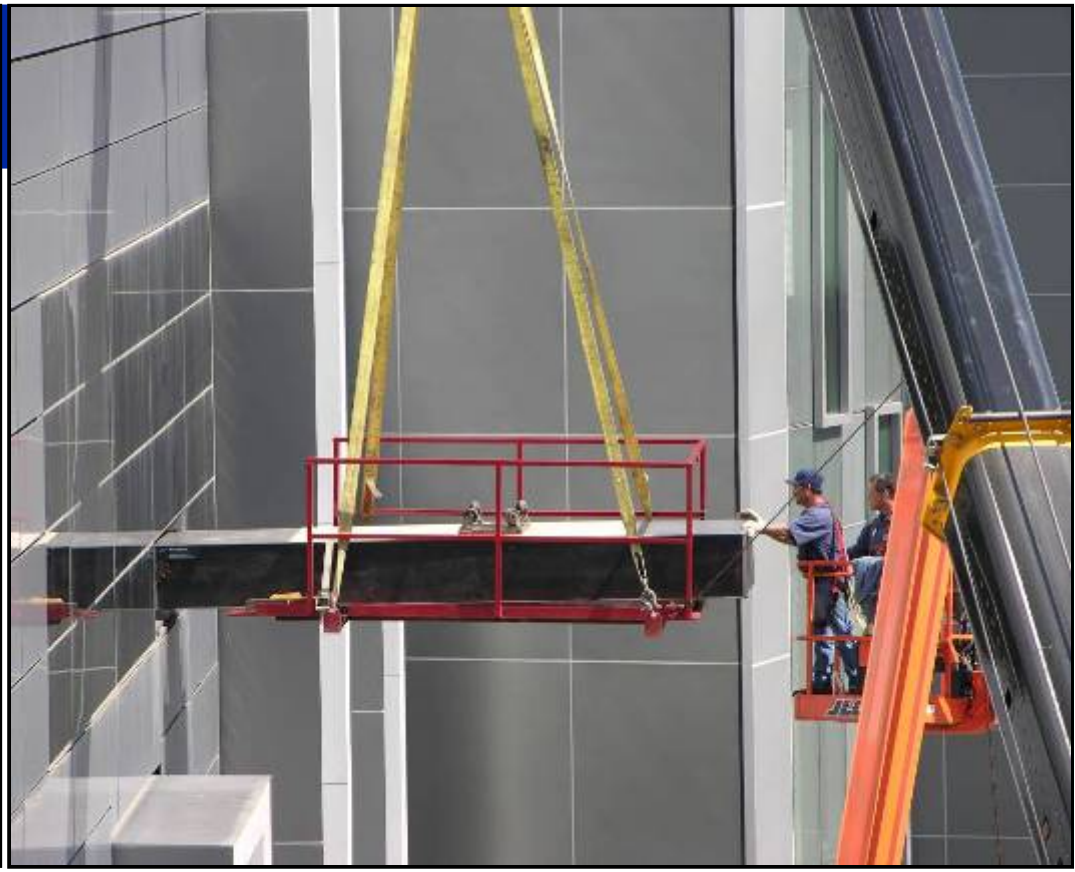
The Big Table moves into Calit2's Photonics Testbed: Saturday March 25th 2006



Saturday morning matinee



Calit2's freight elevator



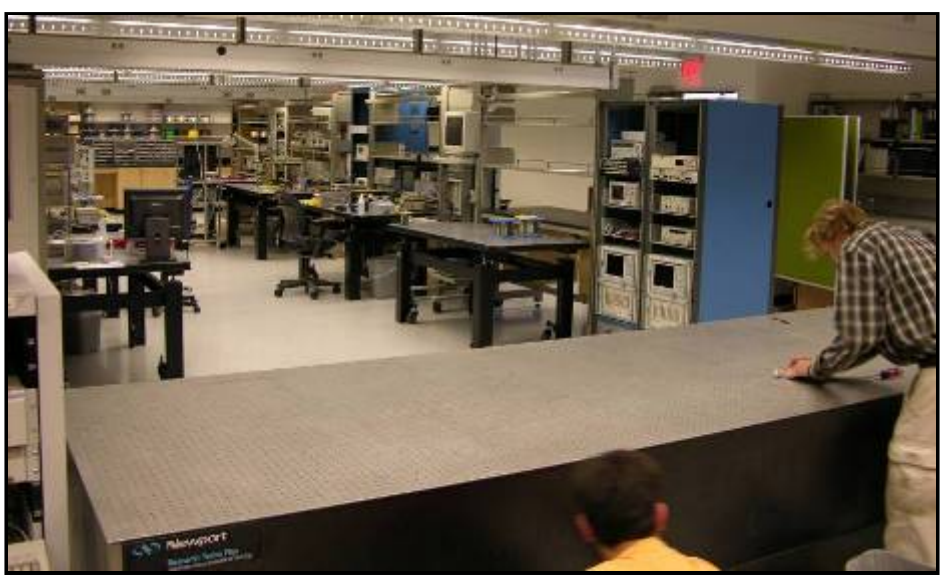
Tight alignment tolerances!



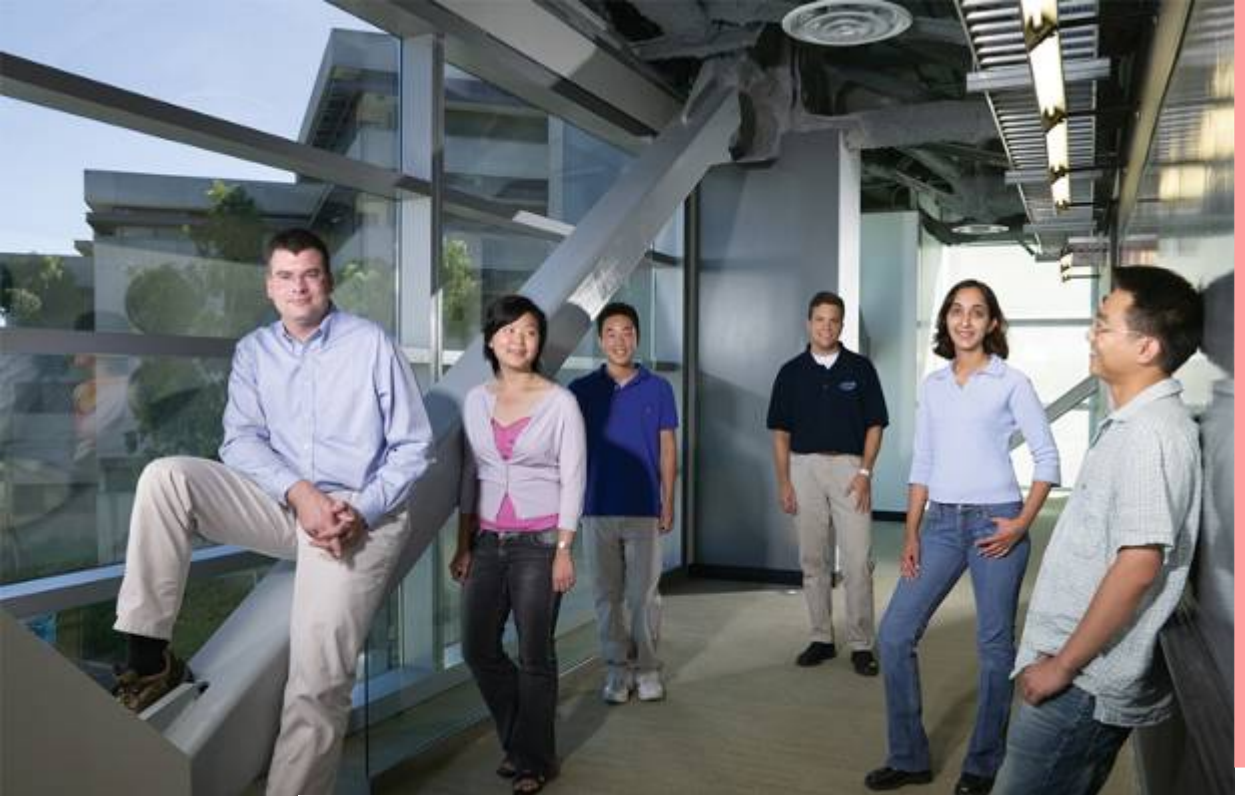
Mail call…



The boss watches



Home sweet home



New Centers

- ✓ Information Theory & Applications Center
- ✓ Center for Networked Systems
- ✓ Center for Algorithmic and Systems Biology



UCSD
UCIrvine

it²

Calit2 Brings Computer Scientists and Engineers Together with Biomedical Researchers

- **Some Areas of Concentration:**
  - Algorithmic and System Biology
  - Bioinfomatics
  - Metagenomics
  - Cancer Genomics
  - Human Genomic Variation and Disease
  - Proteomics
  - Mitochondrial Evolution
  - Computational Biology
  - Multi-Scale Cellular Imaging
  - Information Theory and Biology
  - Telemedicine

CASB

INSTITUTE FOR GENOMICS AND BIOINFORMATICS
University of California, Irvine

NanoTumor Center

camera
Marine Microbial Ecology

ICSI

JCSG
Joint Center for Structural Genomics

NBCR
National Biomedical Computation Resource
an NIH supported resource center

NCMIR
NATIONAL CENTER for MICROSCOPY and IMAGING RESEARCH
at San Diego, an NIH supported resource center

BIOMEDICAL INFORMATICS RESEARCH NETWORK

WIISARD

lifechips
university of california, irvine
www.lifechips.org

Information Theory and Applications

UCSD
UCIrvine

Southern California Telemedicine Learning Center (TLC)

it2

Funded Projects

OptIPuter / NSF
WIISARD / NIH
RESCUE / NSF
CAMERA /
Moore Foundation



Calit2's WIISARD Project Has Innovatived Wireless Systems to Support SoCal First Responders





















Aug. 22, 2006 MMST Disaster Drill at Calit2@UCSD Involved Over 200 First Responders