“Calit2-Living in the Future"

Briefing

The Future in Review (FiRe) 2006 Conference

University of California, San Diego

May 15, 2006

Dr. Larry Smarr

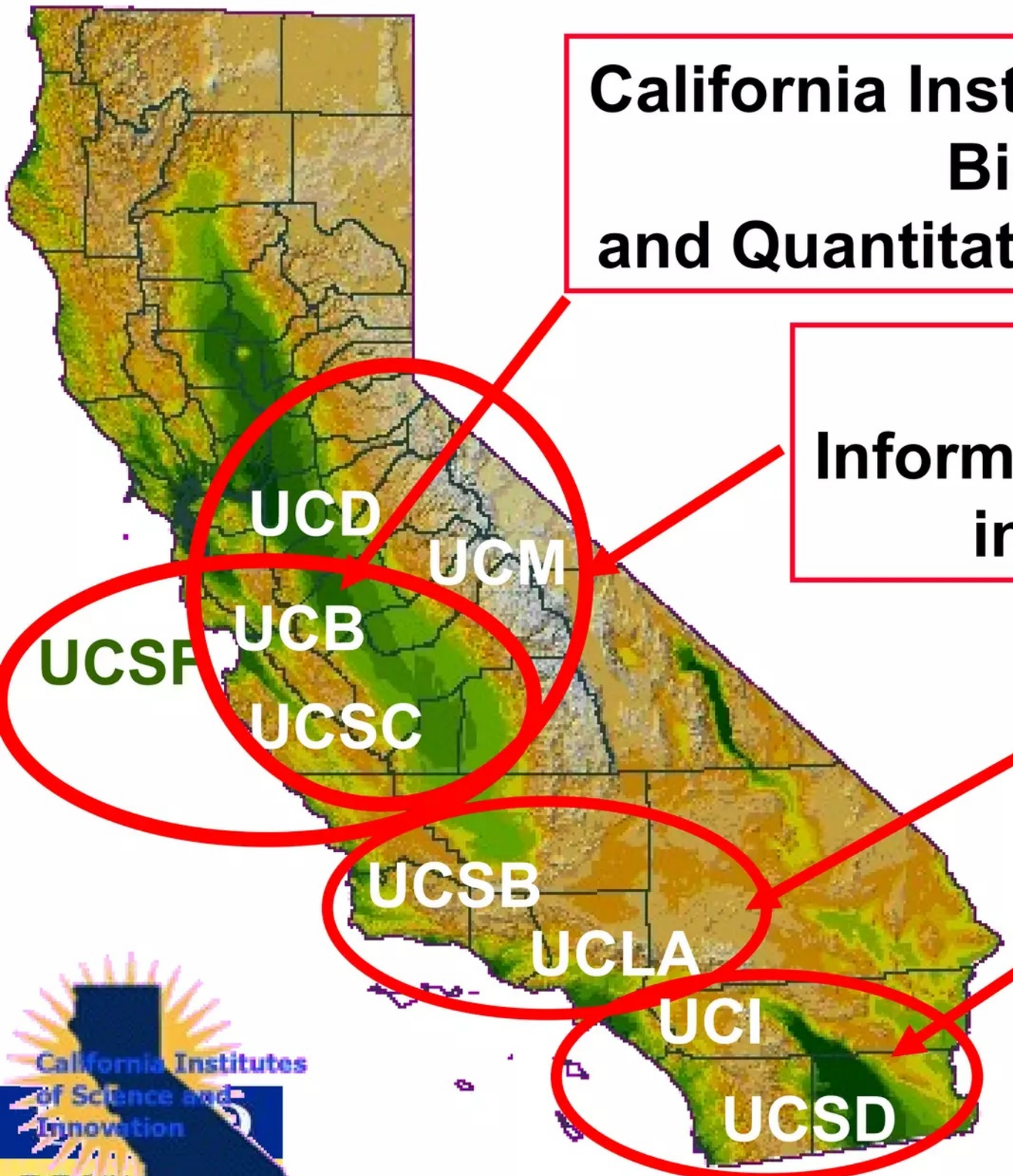
Director, California Institute for Telecommunications and Information Technology

Harry E. Gruber Professor,

Dept. of Computer Science and Engineering

Jacobs School of Engineering, UCSD

California's Institutes for Science and Innovation
A Bold Experiment in Collaborative Research



California Institute for Bioengineering, Biotechnology, and Quantitative Biomedical Research

Center for Information Technology Research in the Interest of Society

California NanoSystems Institute

California Institute for Telecommunications and Information Technology

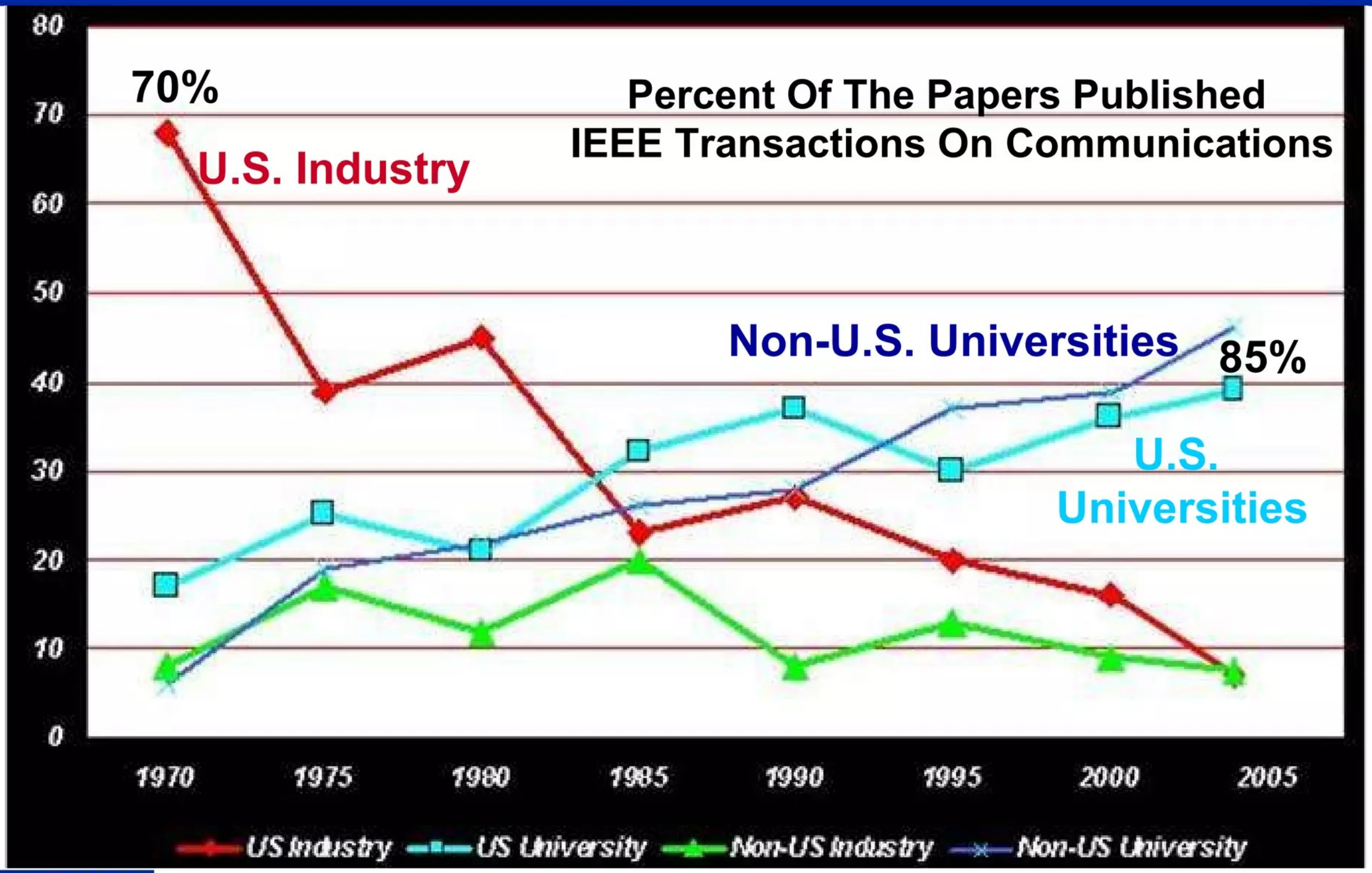
California Institutes of Science and Innovation

UCHRI

it²

www.ucop.edu/california-institutes

Where is Telecommunications Research Performed?
A Historic Shift

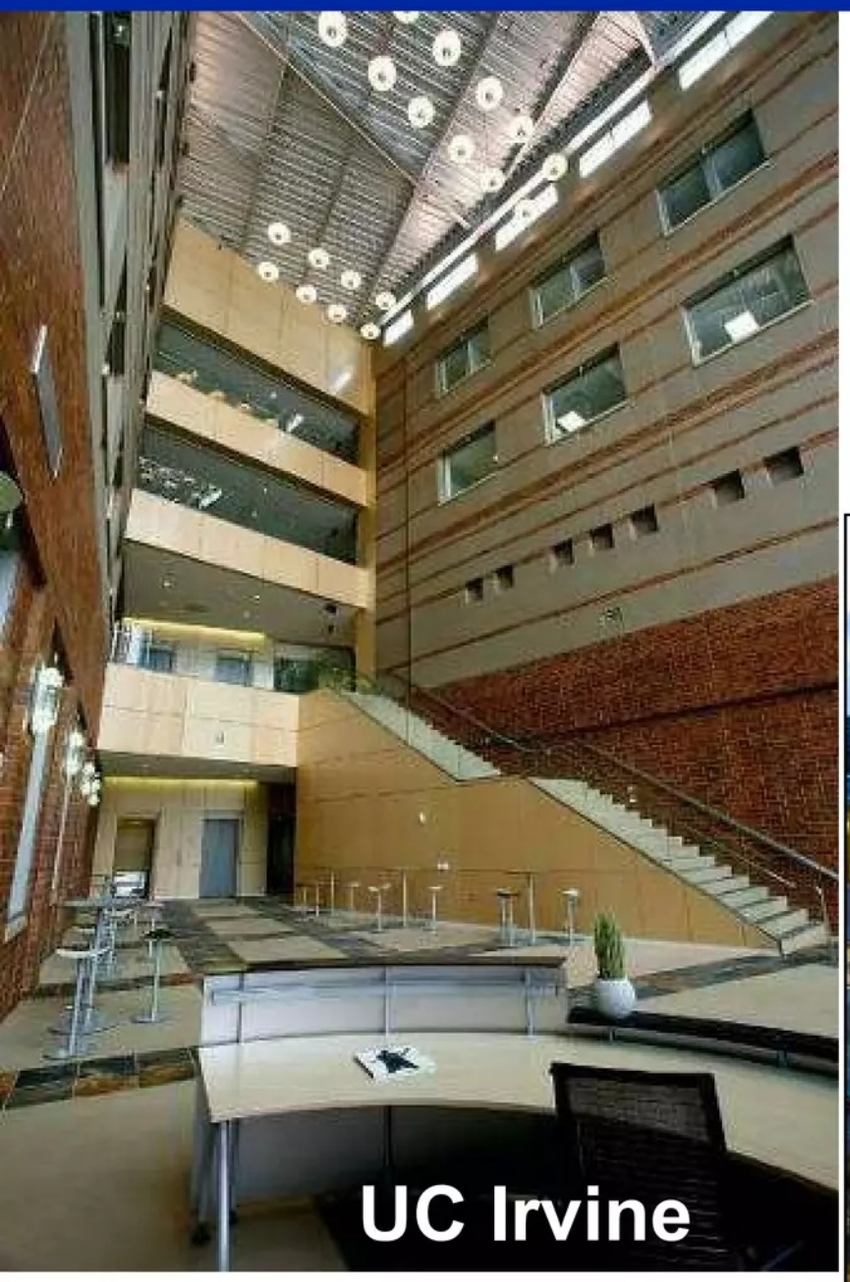


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Source: Bob Lucky, Telcordia/SAIC

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



- **Over 1000 Researchers in Two Buildings**
  - **Linked via Dedicated Optical Networks**
  - **International Conferences and Testbeds**
- **New Laboratories**
  - **Nanotechnology**
  - **Virtual Reality, Digital Cinema**



www.calit2.net

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Preparing for a World in Which Distance is Eliminated…

it²

Calit2 is Experimenting with Open Reconfigurable Work Spaces to Enhance Collaboration





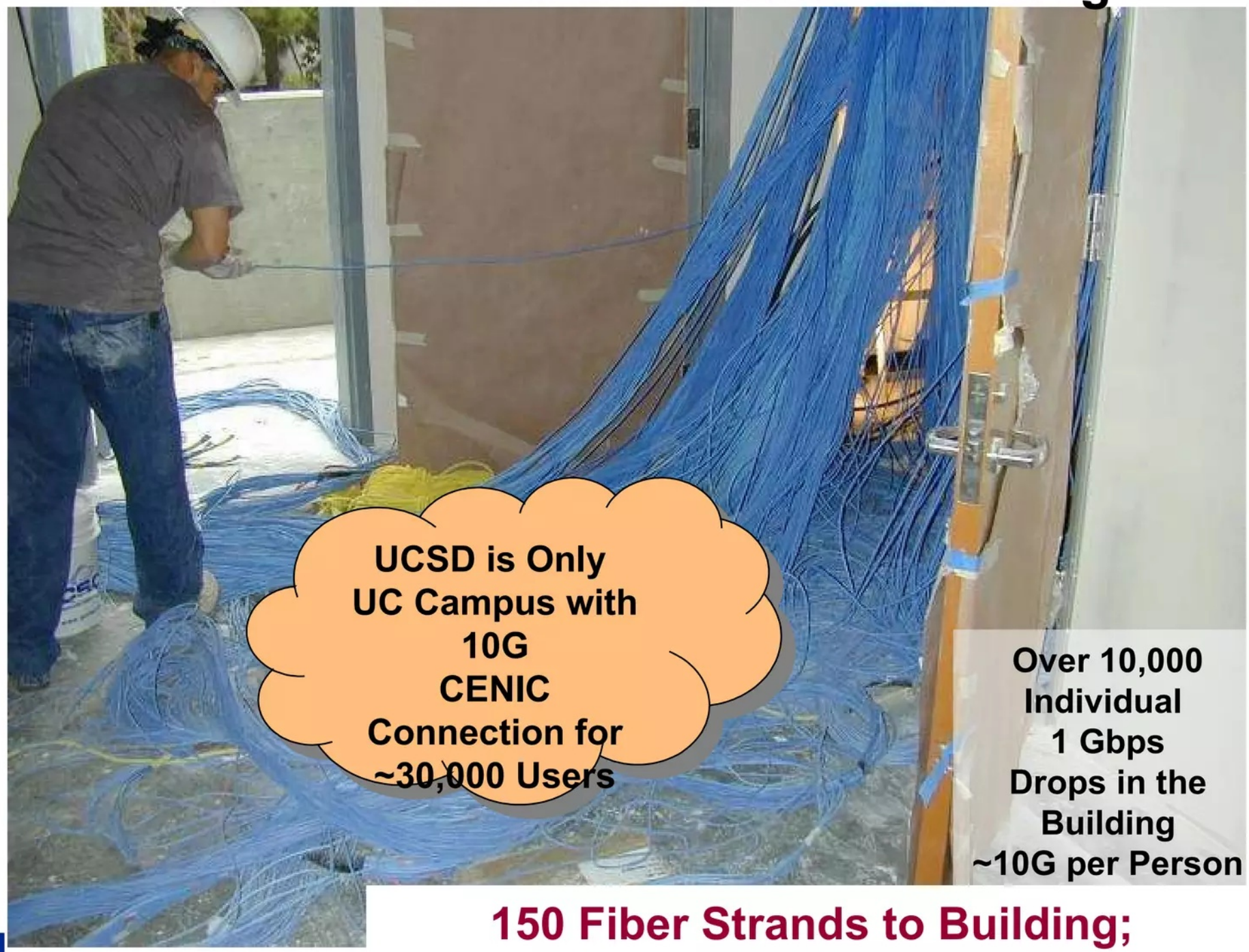
Over Two Dozen Academic Departments in the Building

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Photos by John Durant;
Barbara Haynor, Calit2

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

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Photo: Tim Beach, Calit2

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Borderless Collaboration
Between Global University Research Centers at 10Gbps

Maxine Brown, Tom DeFanti, Co-Chairs

iGrid 2005

THE GLOBAL LAMBDA INTEGRATED FACILITY

www.igrid2005.org

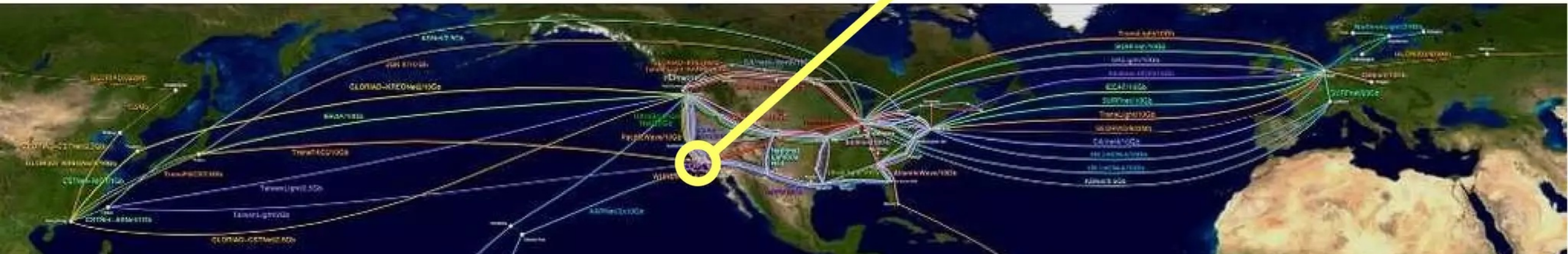


September 26-30, 2005

Calit2 @ University of California, San Diego

California Institute for Telecommunications and Information Technology

the UC Discovery Grant



100Gb of Bandwidth into the Calit2@UCSD Building

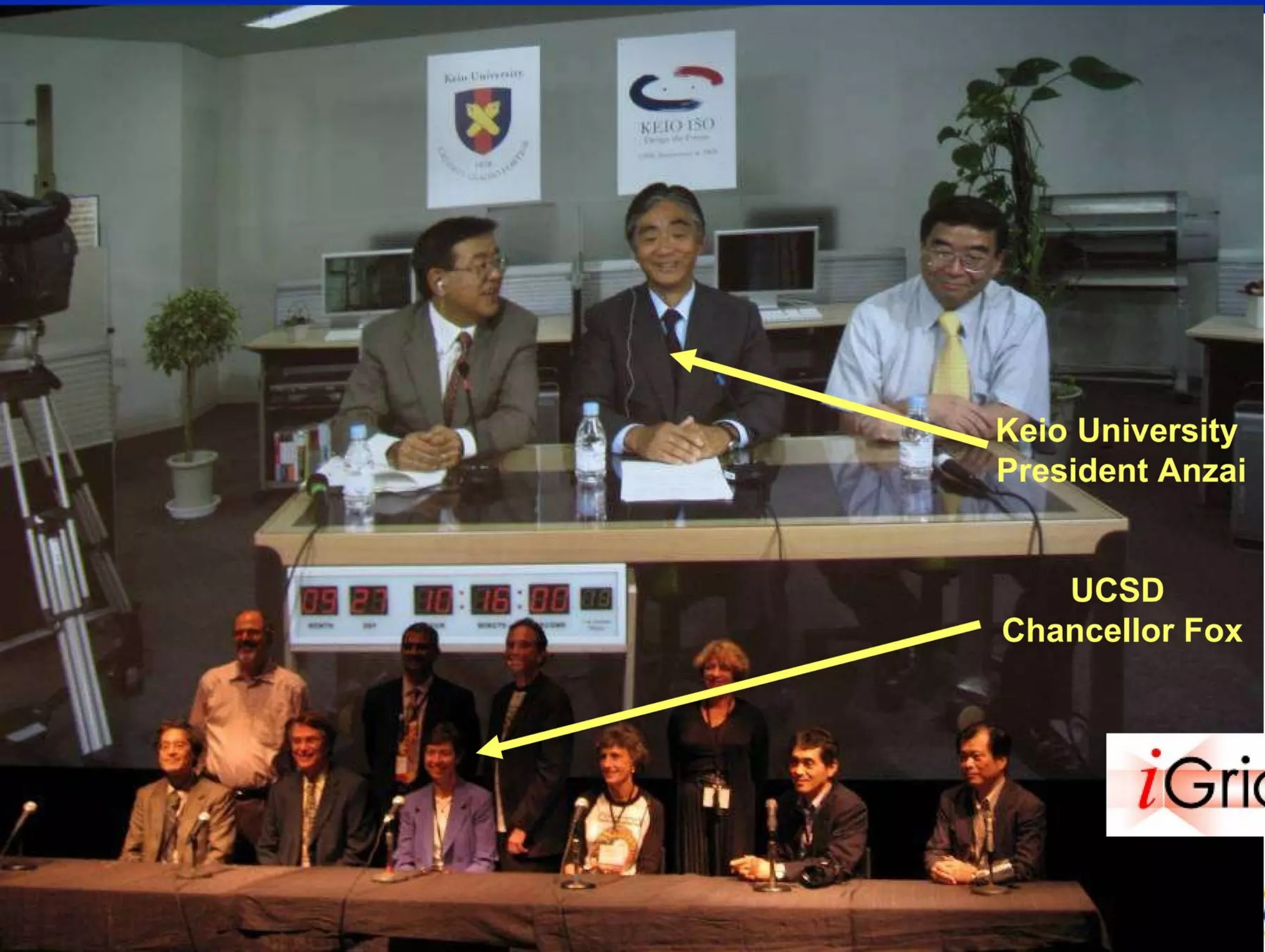
More than 150Gb GLIF Transoceanic Bandwidth!

450 Attendees, 130 Participating Organizations

20 Countries Driving 49 Demonstrations

1- or 10- Gbps Per Demo

First Trans-Pacific Super High Definition Telepresence Meeting in New Calit2 Digital Cinema Auditorium



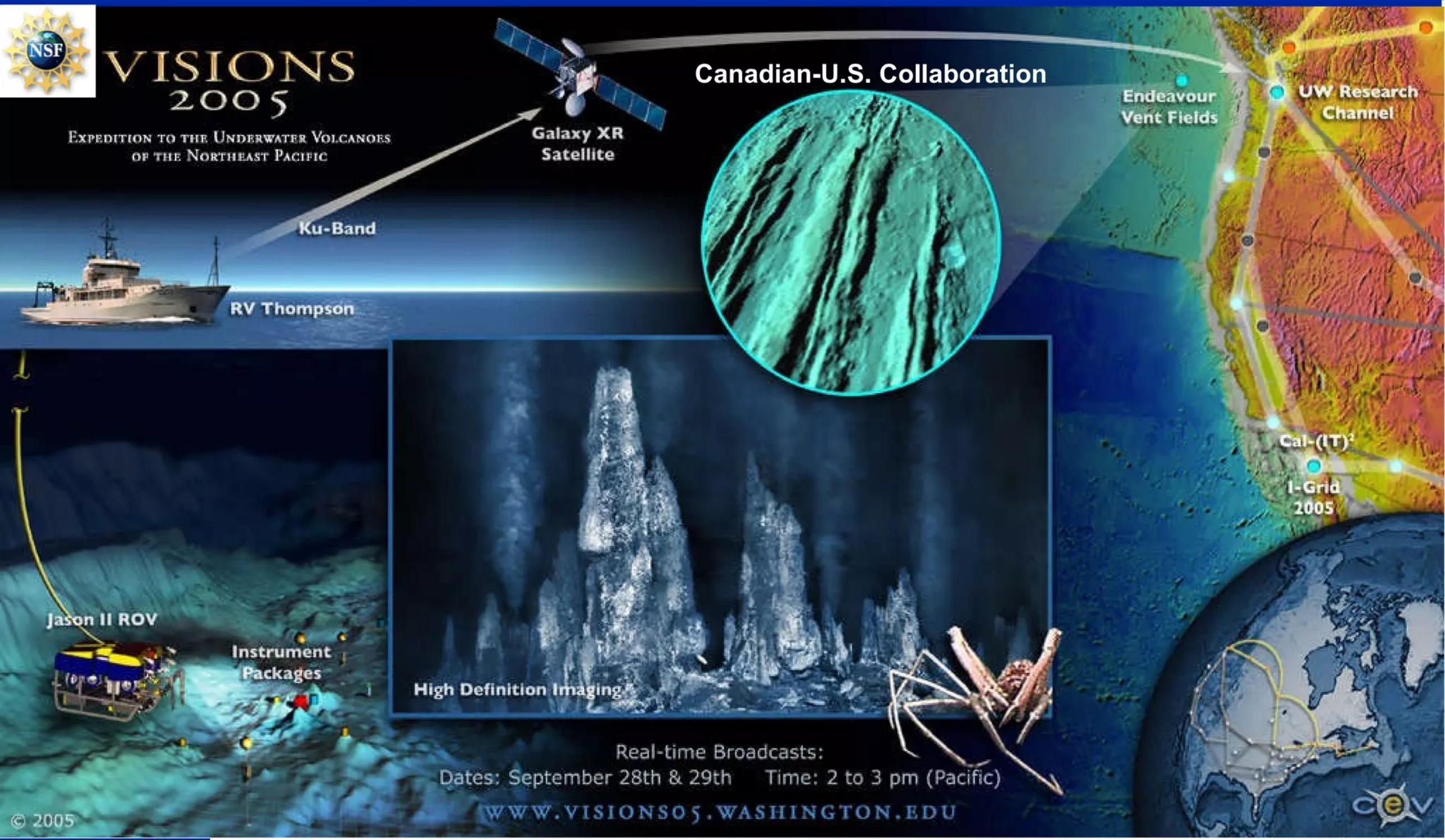
Lays Technical Basis for Global Digital Cinema

Sony
NTT
SGI

iGrid 2005

it²

First Remote Interactive High Definition Video Exploration of Deep Sea Vents



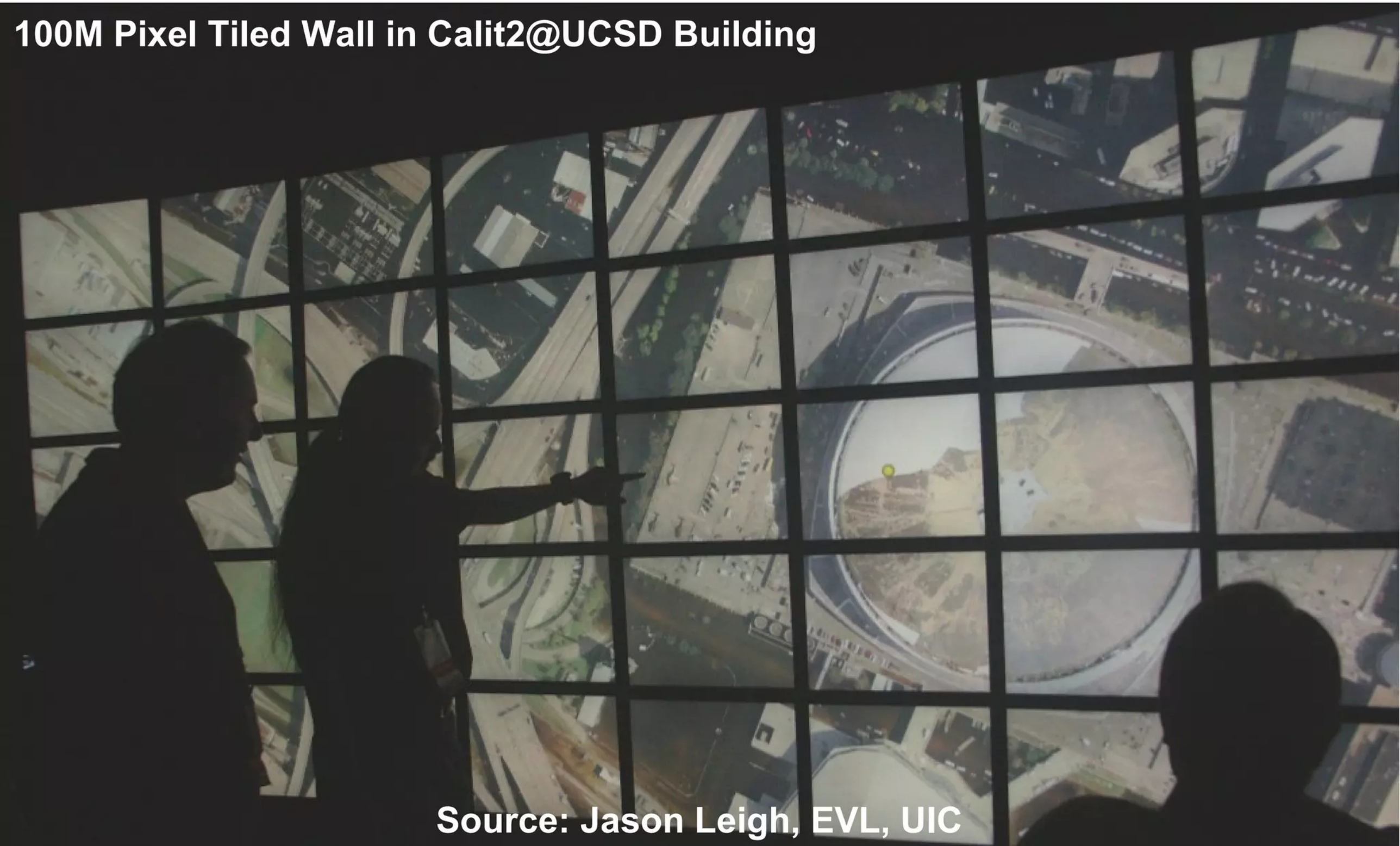
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Source John Delaney & Deborah Kelley, UWash

Prototyping the PC of 2015
One Hundred Million Pixels Connected at 10Gbps

Calit2 Working with NASA, USGS, NOAA, NIEHS, EPA, SDSU, SDSC, Duke, …

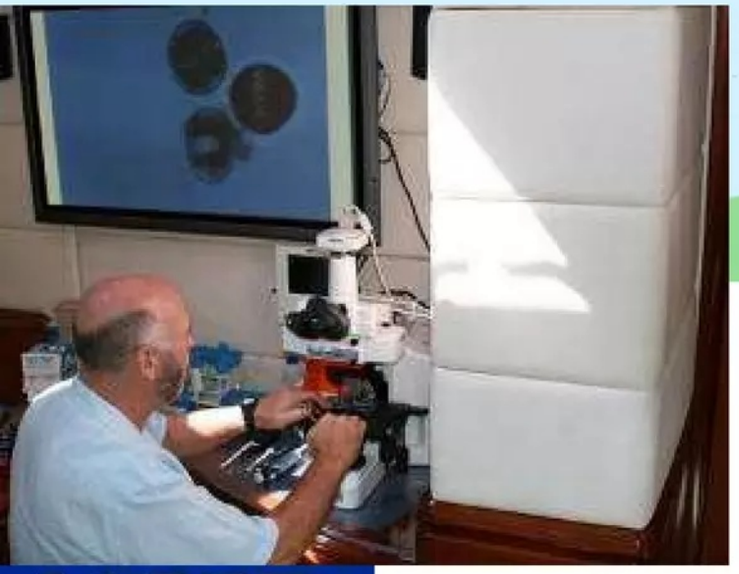
100M Pixel Tiled Wall in Calit2@UCSD Building

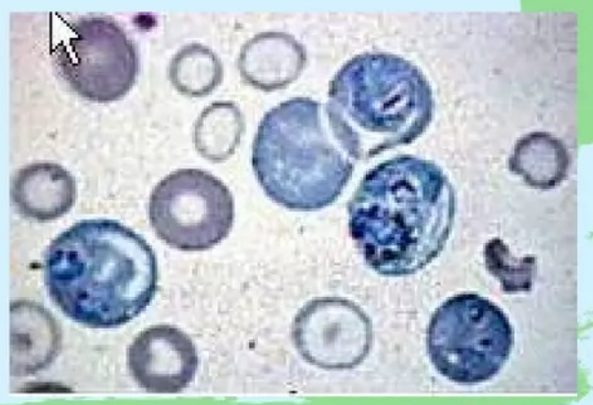


Source: Jason Leigh, EVL, UIC

Marine Genome Sequencing Project
Measuring the Genetic Diversity of Ocean Microbes







Canada
United States
Mexico
Puerto Rico
Honduras
Costa Rica
Panama
Galapagos Islands
x 10 samples
Tanzania/
Zanzibar
x 7 samples
Seychelles
Madagascar
South Africa
Cocos-
Keeling Is.
Vanuatu
x 17 samples
Fiji
Tonga
French
Polynesia
Cook
Islands
Australia
New Caledonia
x 8 samples
Analyzed
Sampled, but not Analyzed

Sorcerer II Data Will Double Number of Proteins in GenBank!

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MARINE MICROBIOLOGY INITIATIVE

Gordon and Betty MOORE FOUNDATION

J. Craig Venter INSTITUTE

it²

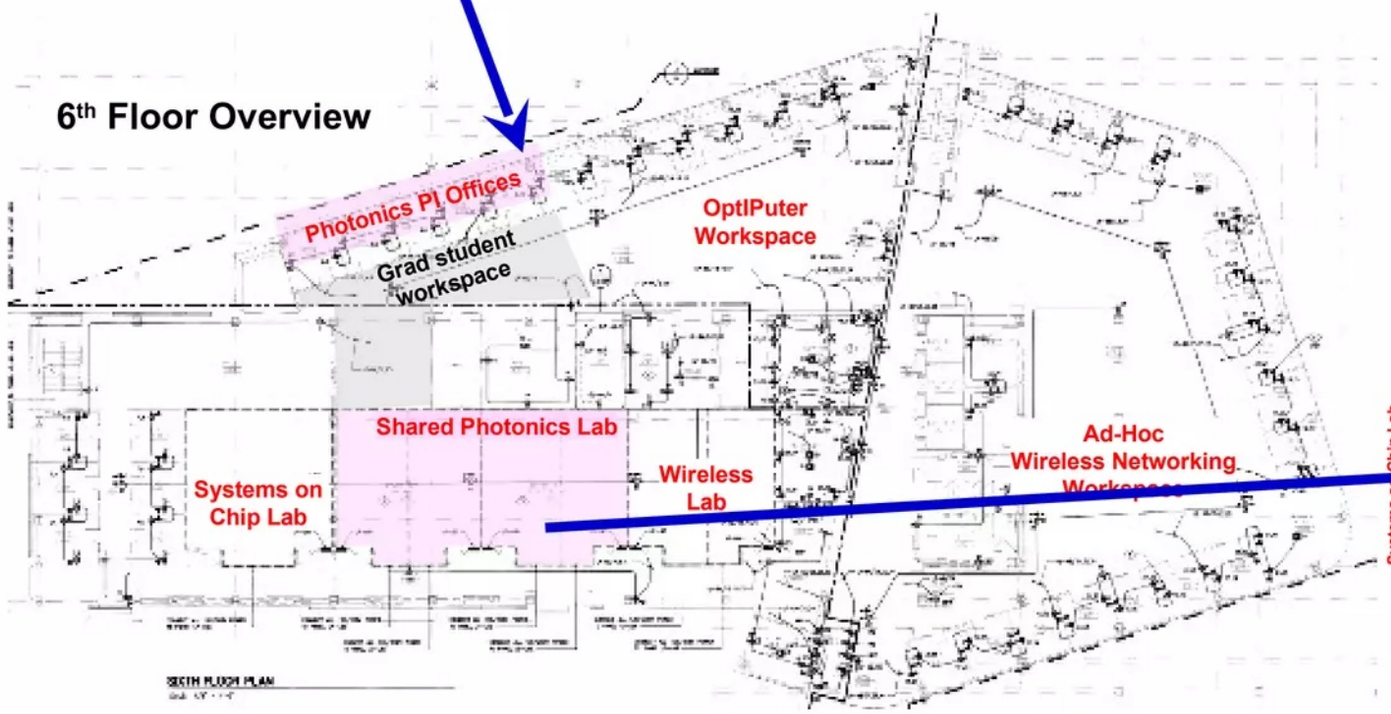
Exploring the Future of Neworked Computer Games-- Center for Research in Computing and the Arts (CRCA)



New Calit2 Photonics Testbed Core Facility-- Inventing the Optics World of 2015



UCSD Photonics



ECE Testbed Faculty



Stojan Radic
Optical communication networks; all-optical processing; parametric processes in high-confinement fiber and semiconductor devices.



George Papen
Advanced photonic systems including optical communication systems, optical networking, and environmental and atmospheric remote sensing.



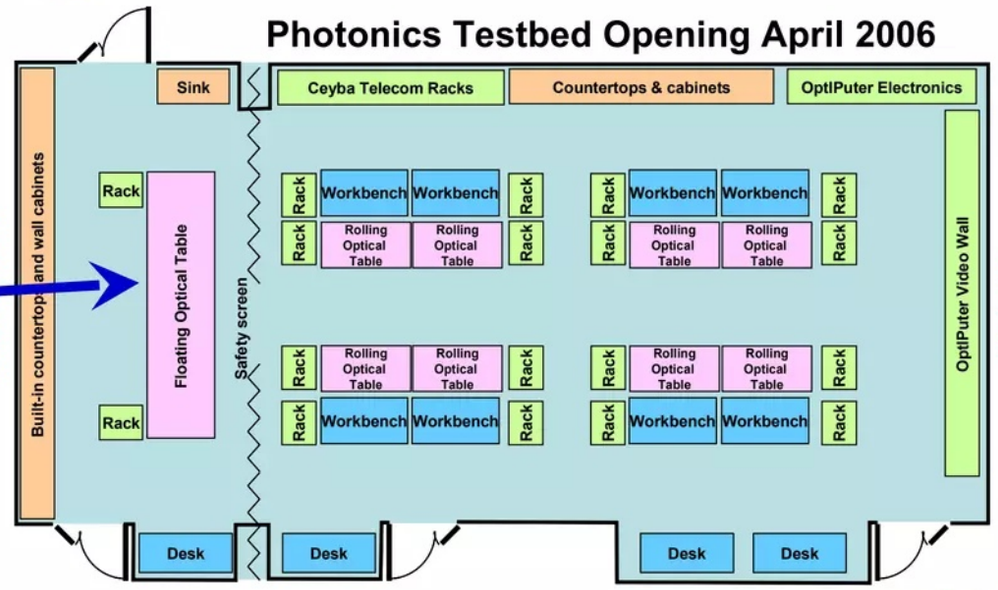
Joseph Ford
Optoelectronic subsystems integration (MEMS, diffractive optics, VLSI); Fiber optic and free-space communications.



Shaya Fainman
Nanoscale science and technology; ultrafast photonics and signal processing



Shayan Mookherjea
Optical devices and optical communication networks, including photonics, lightwave systems and nano-scale optics.



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Multi-Wavelength Array For 1000+ Channel Systems Multichannel Operation To 55 Gb/s

NSF RESCUE Strongly Coupled with NIH WIISARD Grant

Wireless Internet Information System for Medical Response in Disasters

Calit2 is Working Closely with the First Responder Community



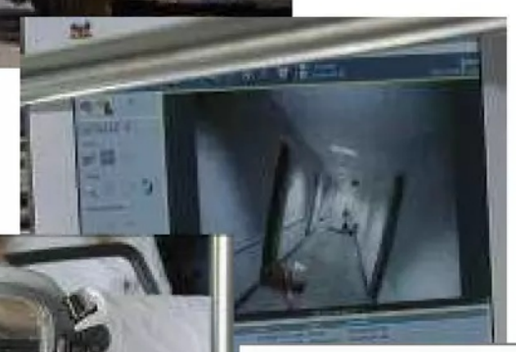




Triage

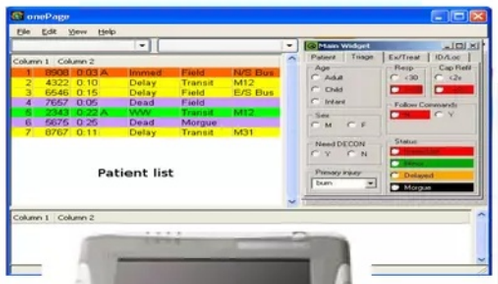
First Tier







802.11 pulse ox







Reality Flythrough
Mobile Video



Mid Tier



Wireless Networks



Command Center

WISARD

it²

Calit2 Global: Bringing Together International Leaders In Academia, Government and Industry



- **Key Foci for the Summit**
  - **Educational Collaboration, Including Training the Indian Workforce**
  - **Fostering Scientific Research Collaboration:**
    - **Wireless,**
    - **Life Sciences, Nanotechnology,**
    - **Intelligent Automotive Systems**
  - **Science for Society**