



*Science and Technology
Centers: Integrative Partnerships
Program*

**Dr. Margaret E. M. Tolbert, Senior Advisor
National Science Foundation
Arlington, Virginia**

February 22, 2007

**Joint NASA/NSF Research and Education Opportunities Conference for
Higher Education Principal Investigators, Faculty, and Partners**

**Westfield Marriott Washington Dulles
Chantilly, VA**



STC Program Description



The STC Program supports innovation in the integrative conduct of research, education and knowledge transfer through partnerships.



History

- First STC Competition -- 1987
- Number of Currently Operational STCs - 13
- Result of Program Evaluation in 1996: Incorporation of “Integrative Partnerships” into the Name
- NSB approved STC Program for competitions every 2-3 years if budget permits
- The competition amount, \$1.5 million to \$4 million per year



Current NSF Funded STC



Adaptive Optics

<http://cfao.ucolick.org/>

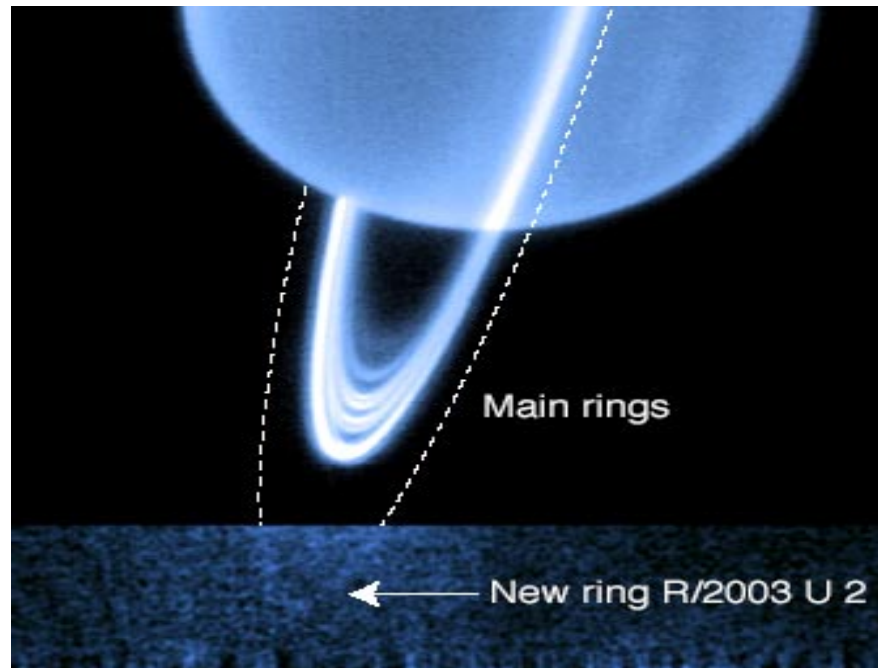
University of California at Santa Cruz (Lead Institution)

Partners:

California Institute of Technology; Indiana University;
Lawrence Livermore National Laboratory;
Michigan Technical University; Montana State University;
University of California at Berkeley;
University of California at Irvine;
University of California at Los Angeles;
University of Chicago;
University of Houston;
University of Rochester



Adaptive Optics STC: Example of Results



Information Source: http://www.berkeley.edu/news/media/releases/2005/12/22_rings.shtml



Advanced Materials for Water Purification

<http://www.watercampws.uiuc.edu/>

University of Illinois at Urbana-Champaign (Lead Institution)

Partners:

Clark Atlanta University;

MTR, Inc.;

Ohio State University;

Rose Hulman Institute;

Stanford University;

University of California at Berkeley



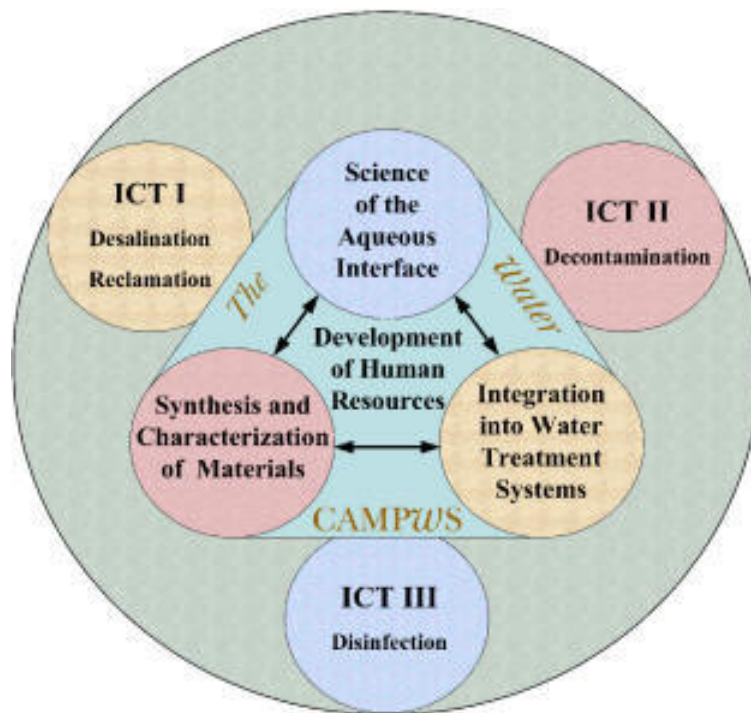
Advanced Materials for Water Purification



Information Source: <http://www.watercampws.uiuc.edu/>



Advanced Materials for Water Purification



Information Source: http://www.watercampws.uiuc.edu/index.pup?menu_item_id=3



Behavioral Neuroscience

<http://www.cbn-atl.org/>

Georgia State University (Lead Institution)

Partners:

Clark Atlanta University;
Emory University;
Georgia Institute of Technology;
Morehouse College;
Morehouse School of Medicine;
Morris Brown College;
Spelman College



Center for Behavioral Neuroscience STC

CBN consists of interdisciplinary, multi-institutional programs integrating research, education and knowledge transfer. More than 90 neuroscientists lead the programs, along with a cadre of some 50 graduate students and 20 postdoctoral researchers. CBN's mission includes:

- Research on the neurobiology of social behavior, and the effects of the environment and social experiences on the nervous system;
- An education program designed to recruit and retain women and under-represented minorities to neuroscience education programs;
- Knowledge transfer to improve science literacy among the public, and to commercialize CBN discoveries.

Information Source: <http://www.cbn-atl.org/about/index.html>



Biophotonics

<http://cbst.ucdavis.edu/>

University of California at Davis (Lead Institution)

**Alabama A&M University; Lawrence Livermore National Laboratory; Mills College;
Stanford University; University of California at Berkeley; University of California at San
Francisco;
University of Texas at San Antonio**

Earth-surface Dynamics

<http://www.nced.umn.edu/>

University of Minnesota at Twin Cities (Lead Institution)

**Fond du Lac Tribal and Community College; Massachusetts Institute of Technology; Princeton
University;
Science Museum of Minnesota; University of California at Berkeley; University of Wyoming**



Embedded Networked Sensing

<http://www.cens.ucla.edu/>

University of California at Los Angeles (Lead Institution)

**Buckley School; California Institute of Technology;
California State University at Los Angeles;
New Roads School; University of California at Merced;
University of California at Riverside;
University of Southern California**

Environmentally Responsible Solvents and Processes

<http://www.nsfstc.unc.edu/>

University of North Carolina at Chapel Hill (Lead Institution)

**Georgia Institute of Technology; North Carolina A&T State University;
North Carolina State University; University of Texas at Austin**



Integrated Space Weather Modeling

<http://www.bu.edu/cism/>

Boston University (Lead Institution)

**Alabama A&M University; Dartmouth College; National Center for Atmospheric Research;
Science Applications International Corporation; Space Science Institute; Stanford University;
University of California at Berkeley; University of Colorado at Boulder;
University of Texas at El Paso; William Marsh Rice University**

Materials and Devices for Information Technology Research

<http://stc-mditr.org/>

University of Washington (Lead Institution)

**California Institute of Technology; Georgia Institute of Technology; University of Arizona; University of California at
Berkeley; University of California at Santa Barbara
University of Southern California**



Nanobiotechnology

<http://www.nbtc.cornell.edu/>

Cornell University (Lead Institution)

Clark Atlanta University; Howard University; Oregon Health and Science University;
Princeton University; Sciencenter; Wadsworth Center

Sustainability of semi-Arid Hydrology and Riparian Areas

<http://www.sahra.arizona.edu/>

University of Arizona (Lead Institution)

Arizona State University; Desert Research Institute; New Mexico Institute of Mining and Technology;
Northern Arizona University; Pennsylvania State University; University of California at Irvine;
University of California at Los Angeles; University of California at Merced;
University of California at Riverside; University of California at San Diego; University of Colorado;
University of New Mexico; Utah State University



Remote Sensing of Ice Sheets

<http://www.cresis.ku.edu/>

University of Kansas (Lead Institution)

**Elizabeth City State University;
Haskell Indian Nations University;
Ohio State University;
Pennsylvania State University; and
University of Maine**



Remote Sensing of Ice Sheets

About CReSIS:

The remoteness, complex structure and vast size of the Greenland and Antarctic ice sheets call for a multidisciplinary research approach centered around remote sensing that integrates expertise in electrical engineering, information technology, aerospace engineering, glaciology and geophysics. CReSIS will establish a science-driven technology development program to advance the knowledge of ice-sheet characteristics and processes. Learn even more about us by taking the links below.

Information Source: <http://www.cresis.ku.edu/about.htm>



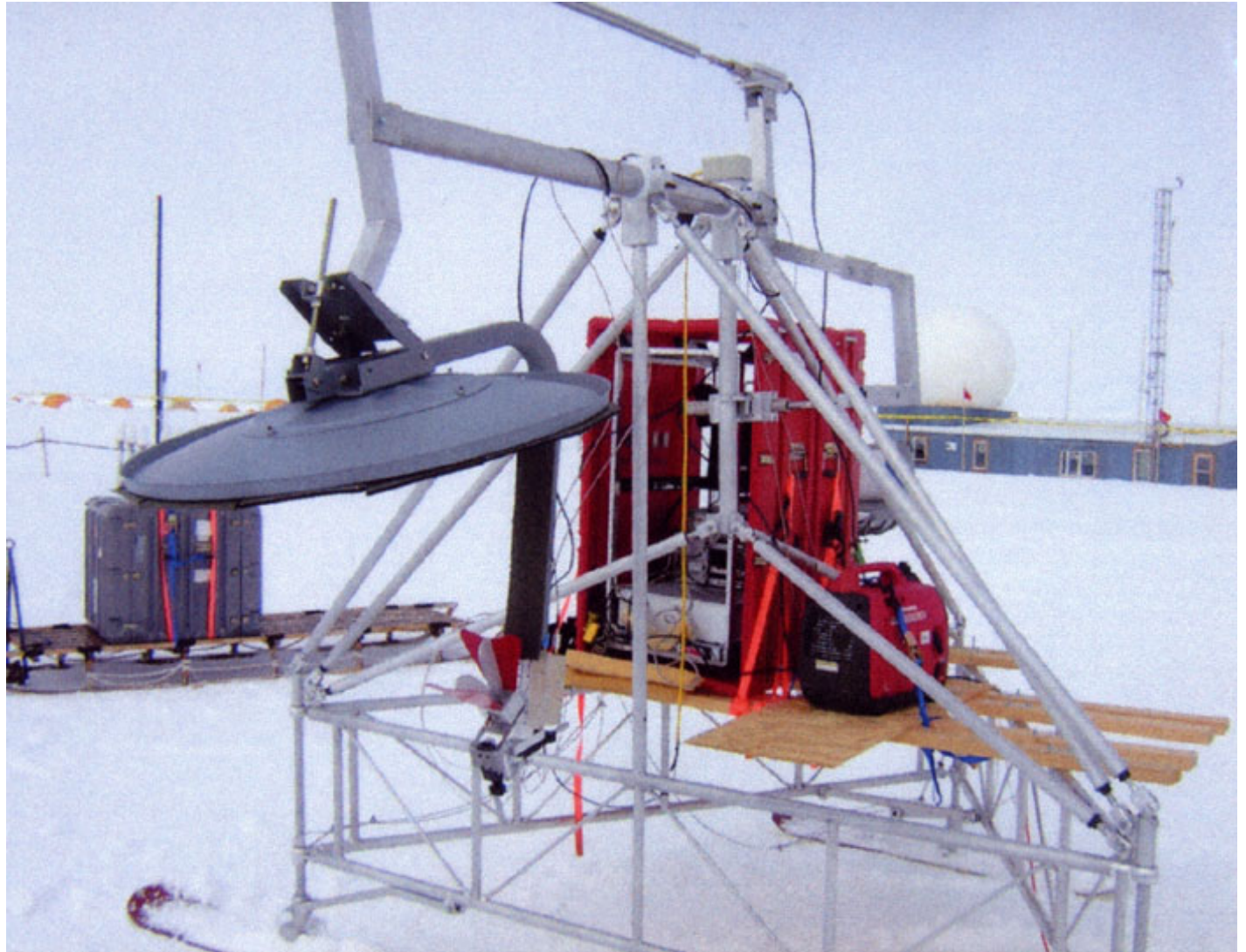
CRISIS Experiment: Observing Stratigraphy in Snowpit

Information Source: <http://www.crisis.ku.edu/HighlightsPoster1.htm>



CRISIS Experiment: Measuring Temperature in Snowpit

Information Source: <http://www.crisis.ku.edu/HighlightsPoster1.htm>



CReSIS Experiment: Sled with Gimbaled Antenna Mount

Information Source: <http://www.cresis.ku.edu/HighlightsPoster1.htm>



CRISIS Experiment: new sensors, platforms, and cyberinfrastructure tools



Knowledge Transfer

Crucial to the CReSIS mission are activities to share what we learn with others. These "Knowledge Transfer" activities will benefit industry, advance scientific knowledge and educate policy-makers and the general public. Knowledge transfer goals also include technology assistance and providing learning opportunities for staff at partner institutions.

Through the transfer of knowledge gained as a result of CReSIS, the program participants are able to contribute to:

- Economic Development,
- Public Policy,
- Scientific Research,
- Public Education, and
- Technical Assistance.



Team for Research on Ubiquitous Secure Technology

<http://trust.eecs.berkeley.edu/>

University of California at Berkeley (Lead Institution)

**Carnegie Mellon University; Cornell University;
Mills College; San Jose State University;
Smith College; Stanford University;
Vanderbilt University**



Team for Research on Ubiquitous Secure Technology

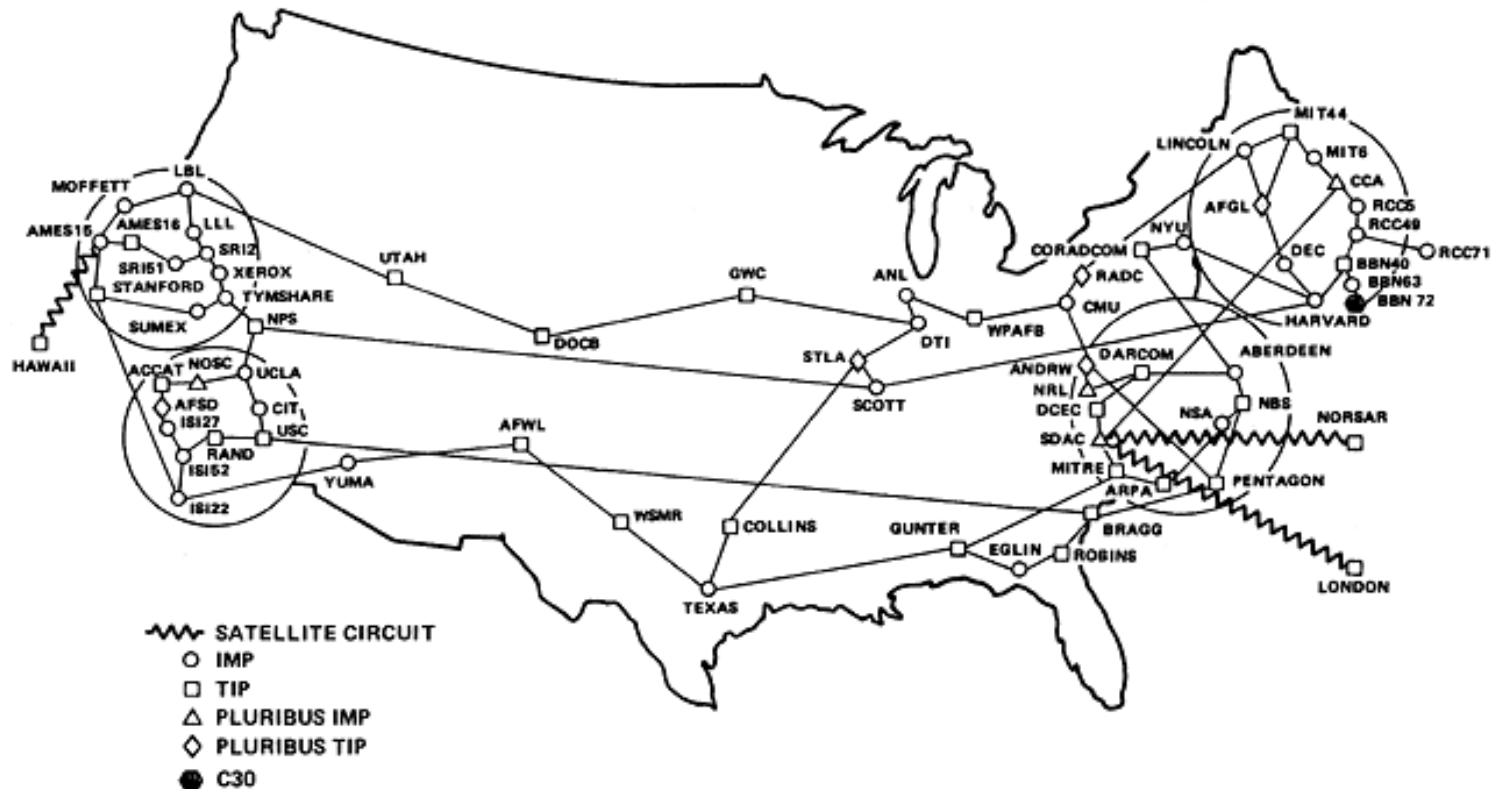
The Team for Research in Ubiquitous Secure Technology (TRUST) is devoted to the development of a new science and technology that will radically transform the ability of organizations (software vendors, operators, local and federal agencies) to design, build, and operate trustworthy information systems for our critical infrastructure.

Information Source: <http://trust.eecs.berkeley.edu/>



The Internet in 1980

ARPANET GEOGRAPHIC MAP, OCTOBER 1980

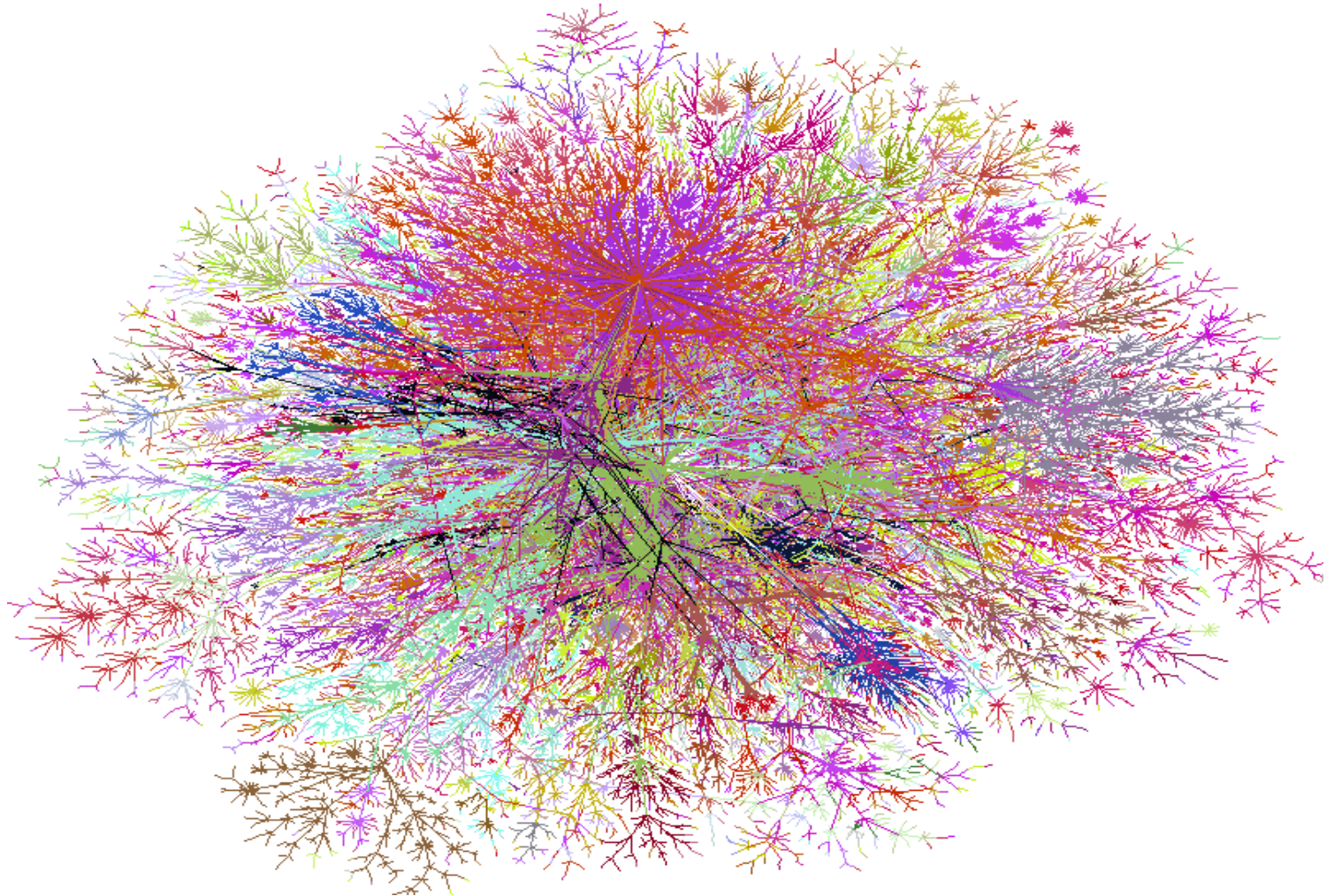


(NOTE: THIS MAP DOES NOT SHOW ARPA'S EXPERIMENTAL SATELLITE CONNECTIONS)
NAMES SHOWN ARE IMP NAMES, NOT (NECESSARILY) HOST NAMES



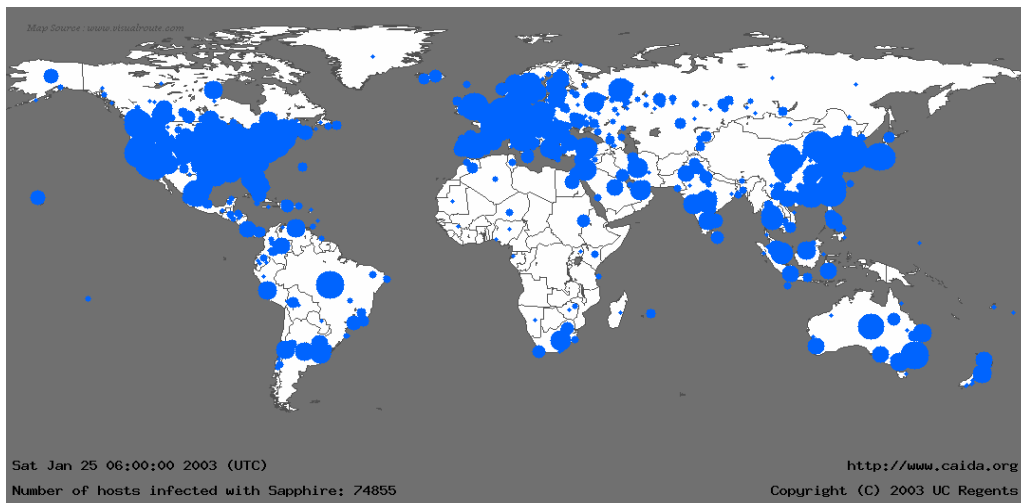
The Internet Today

<http://cm.bell-labs.com/who/ches/map/gallery/index.html>





Bad Code + Big Networks = Problems



Geographic spread
of Sapphire worm
30 minutes after
release

Source:

<http://www.caida.org>

- Code Red worm (Summer 2001)
 - Infected 360,000 hosts in 10 hours (CRv2)
- Sapphire/Slammer worm (Spring 2003)
 - 90% of Internet scanned in <10mins



Oregon Health & Science University STC

COASTAL MARGIN OBSERVATION AND PREDICTION (C – MOP)

Academic Partners:

Oregon Health & Science University
Oregon State University
University of Washington
Portland State University
University of Maryland Center for
Environmental Science
University of Utah

Industry partners:

Intel Corporation
IBM Corporation
WET Labs

K-12 Partners:

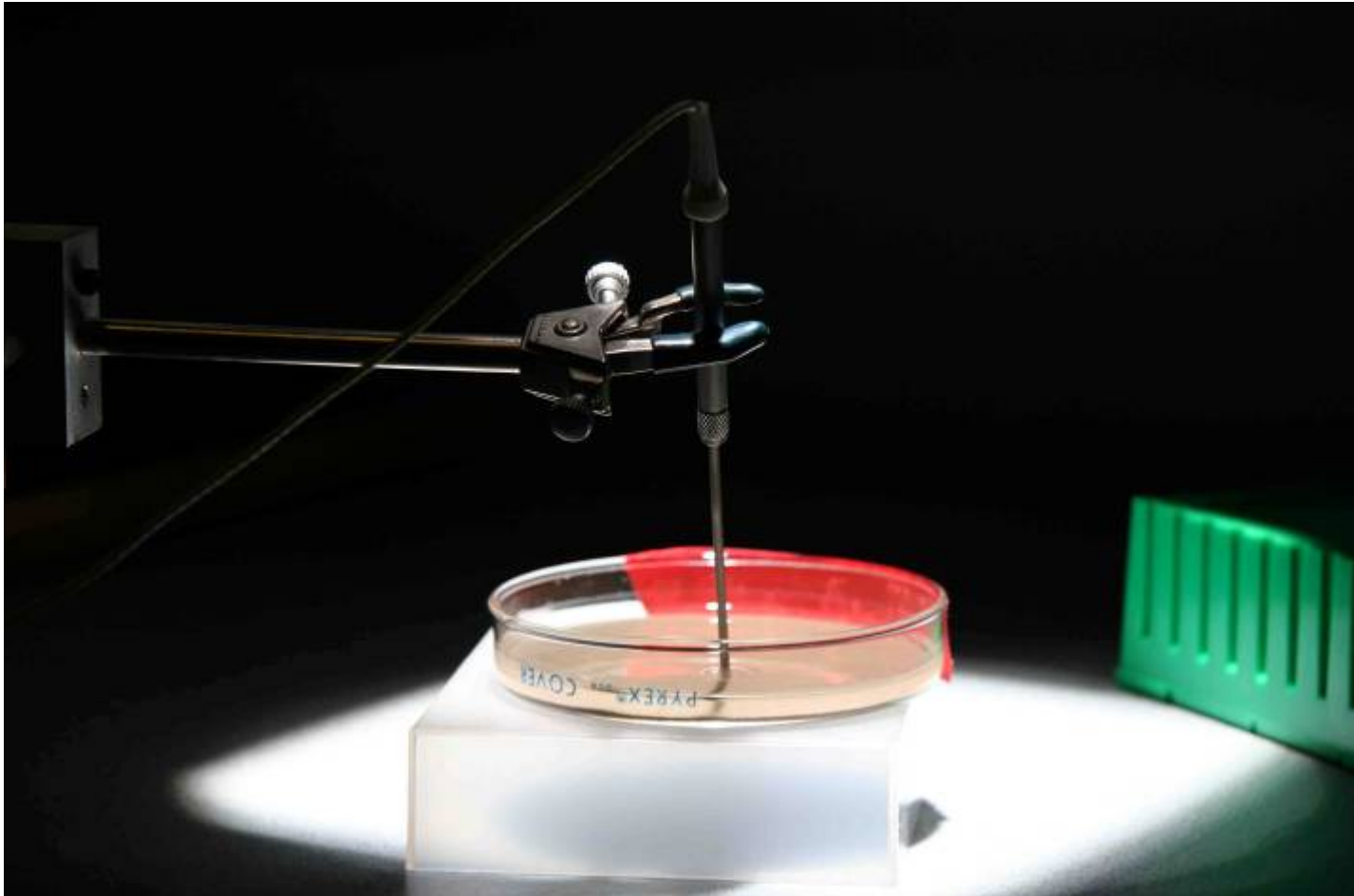
Saturday Academy
The SMILE Program (OSU)
Center for Diversity and Multi-
Cultural Affairs (OHSU)
Office of Science Education
(OHSU)

Teachers from:

Corbett High School



Testing an Electrode for Profiling across the Sediment-Water Interface



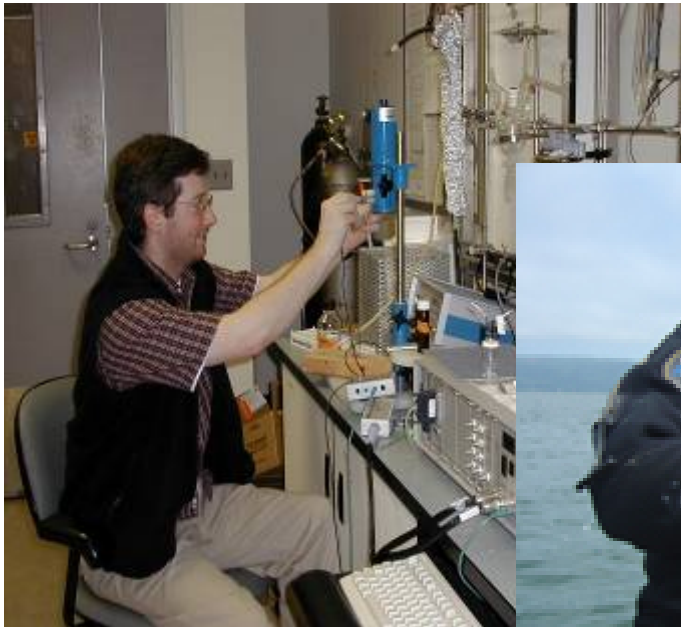
Information Source: <http://www.stccmop.org/node/89>

C-MOP



C - MOP

Scenes from the Laboratory to the Ocean



Developing Electrochemical Sensors



Preparing a Sensor for Deployment



Deploying A Buoy



Center for Microbial Oceanography: Research & Education (C-MORE)

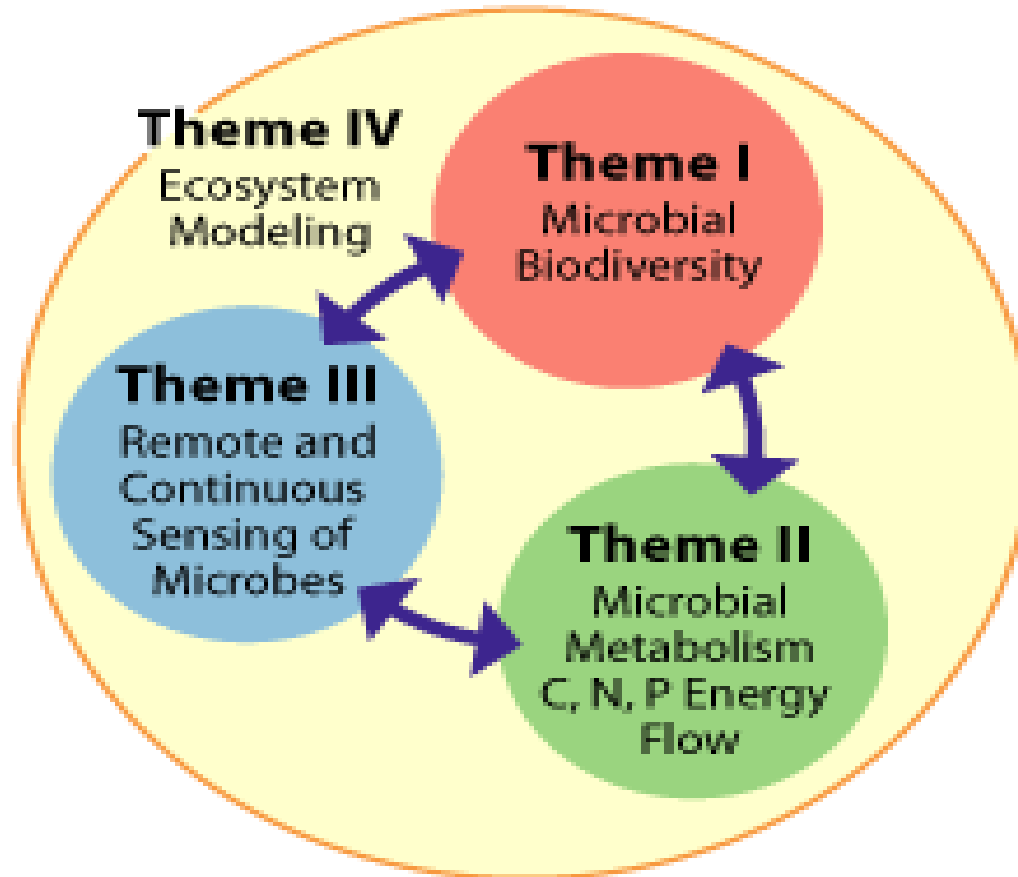


University of Hawaii, Lead Institution

Information Source: <http://cmore.soest.hawaii.edu/index.htm#news>

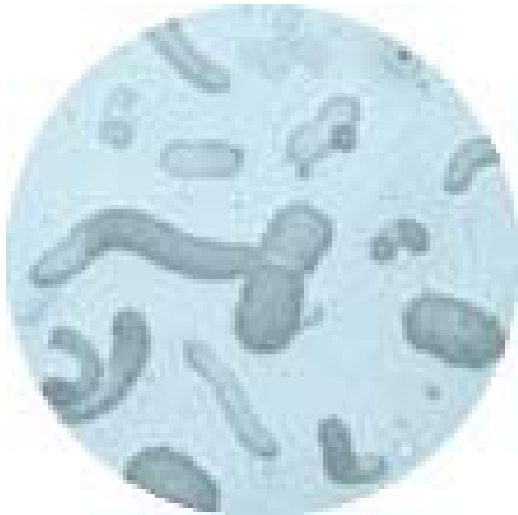
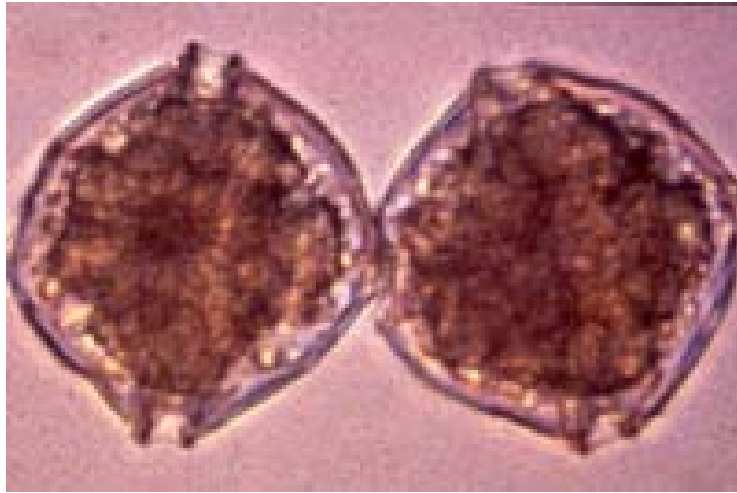


Center for Microbial Oceanography: Research & Education





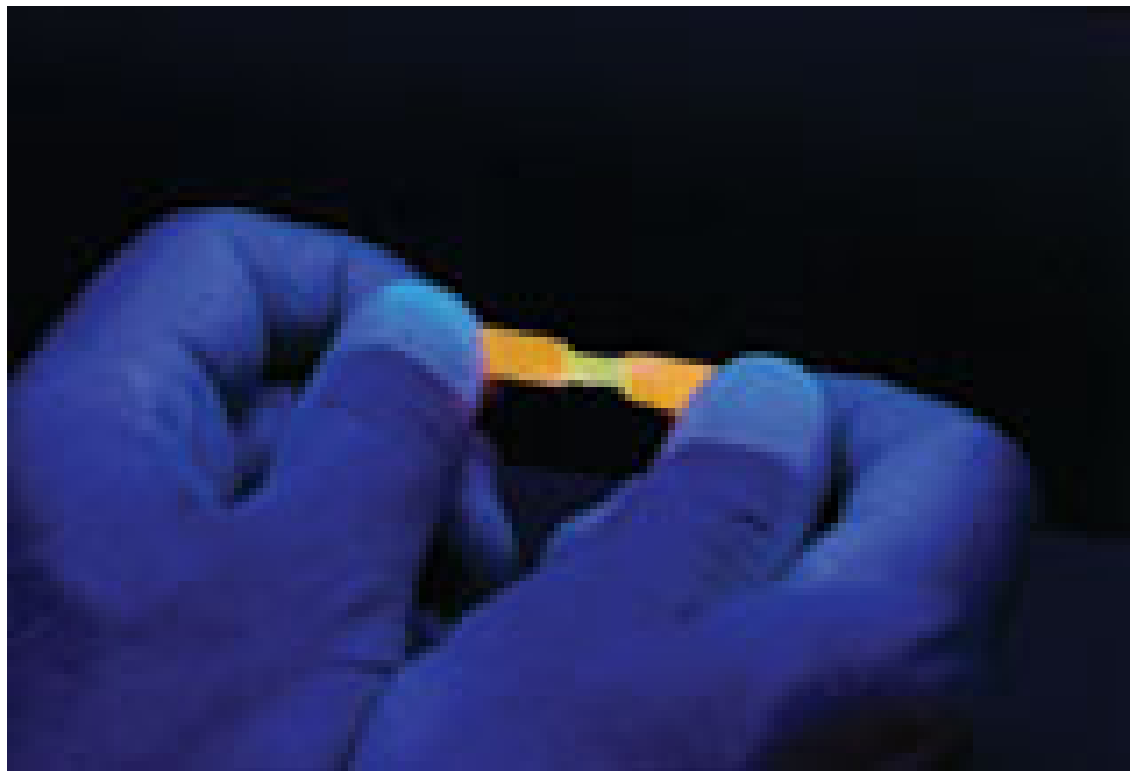
C-MORE



Information Source: <http://cmore.soest.hawaii.edu/index.htm#news>



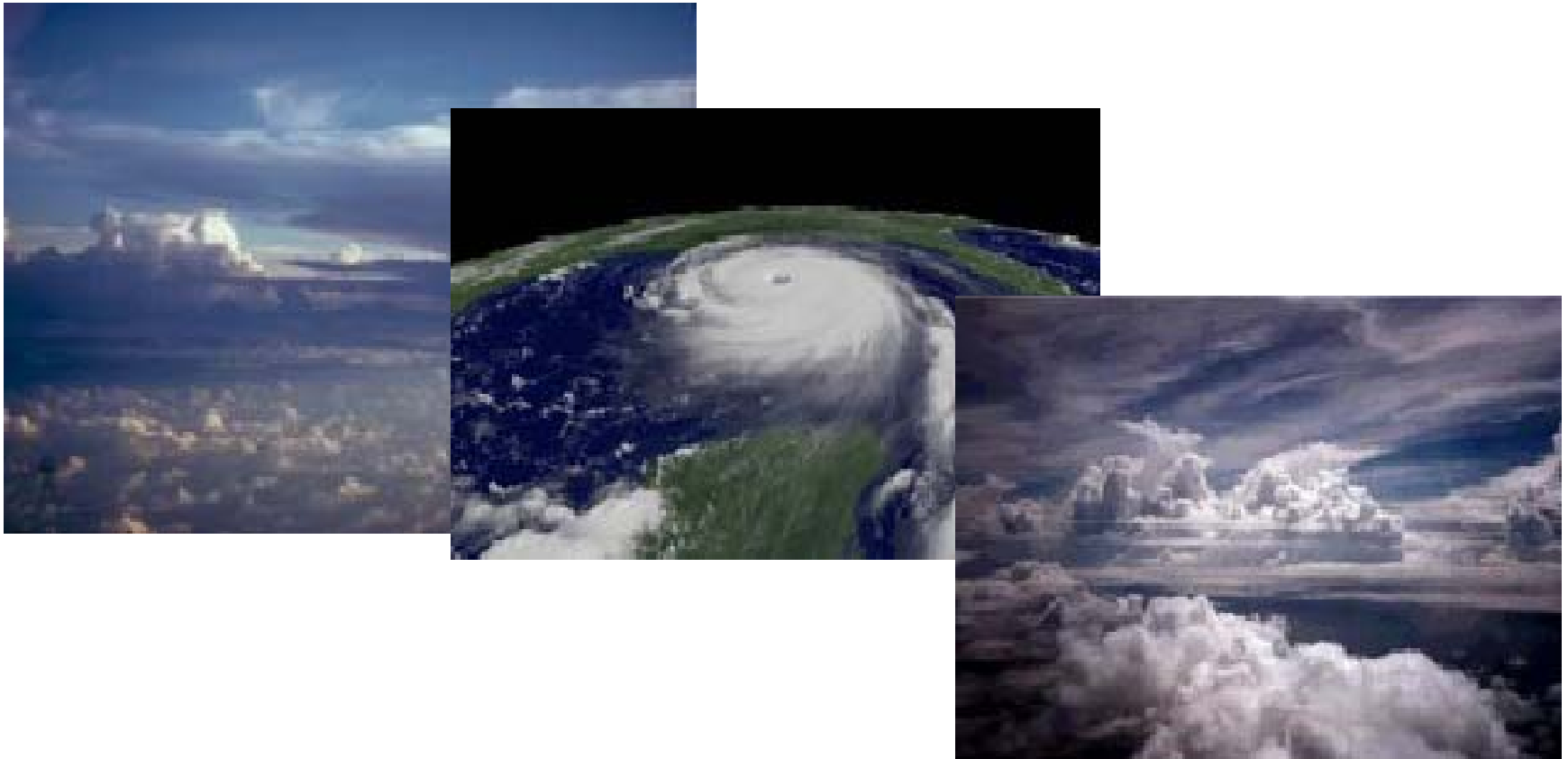
Case Western Reserve University STC
**Center for Layered Polymeric Systems
(CLiPS)**



Information Source: <http://www.engineering.case.edu/>



Colorado State University STC
**Center for Multi-Scale Modeling of
Atmospheric Processes (CMMAP)**



Information Source: http://kiwi.atmos.colostate.edu:16080/cmmmap/docs/CMMAP_SI_Plan.pdf



Student Programs at STCs: Making Contact

- **Direct Access to STCs**
 - Obtain information from the STC website.
 - Contact the appropriate persons for information on the program.
- **Apply for Fellowship from QEM.**
- **Apply for Fellowship from HACU.**
- **Apply for funding from other sources.**



Student Programs at STCs: Making Contact

- Access to internships, fellowships, or graduate assistantships can be gained by contacting one or more of the following.
 - ✓ Active NSF-sponsored Science and Technology Centers, which are described at <http://www.nsf.gov/od/oia/programs/stc/>.
 - ✓ QEM (Quality Education for Minorities Network, Inc.) at <http://gemnetwork.gem.org/>.
 - ✓ HACU (Hispanic Association of Colleges and Universities) at http://www.hacu.net/hacu/Default_EN.asp.
 - ✓ Other sources of fellowships, internships, and research assistantships.



STC Education Programs & Initiatives

- The STCs have graduate and post-doctoral initiatives.
- They have as a part of their missions the recruitment and retention of women and underrepresented minorities in the STC programs;
- Their efforts are to increase awareness in the science, engineering, and education components of the STCs.



Question and Answer Period