NIST: Promoting U.S. Innovation and Industrial Competitiveness

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NIST
National Institute of Standards and Technology
Technology Administration
U.S. Department of Commerce

NIST Has Two Main Campuses…

Gaithersburg, MD

Boulder, CO

- 2,800 employees
- ~2,500 associates and facility users
- NIST Research Laboratories
- Hollings Manufacturing Extension Partnership
- Baldrige National Quality Award
- Advanced Technology Program

NIST Partnerships with the Semiconductor Industry

- Student Sponsorships
- Technical Advisory Board Members
- Workshops and Conferences
- NIST IPA Assignment to SRC (1998-1999)

- Standards
- Symposiums, Workshops, and Conferences

- NIST Assignee On Site
- Workshops and Conferences
- Collaborative Research
- Advisory Boards and Working Groups

- Emerging Research Materials
- Emerging Research Devices
- RF and A/MS Technologies
- Front End Processes
- Metrology

- Documentary Standards and Measurement Techniques

- Conference and Workshop Leadership (IRW, IRPS, IEDM)
  - Especially in reliability

SIA / NIST

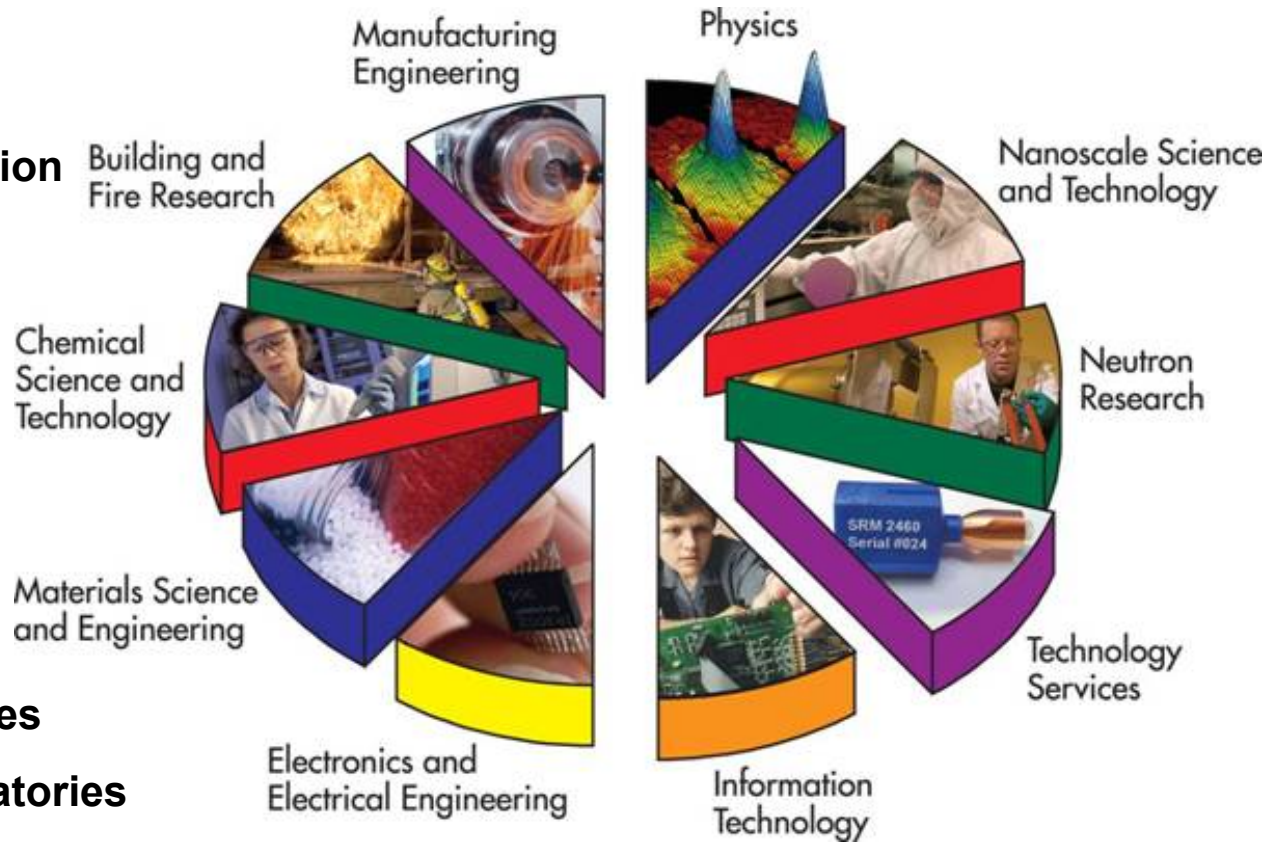
The NIST Laboratories

NIST's work enables

- **Science**
- **Technology innovation**
- **Trade**
- **Public benefit**

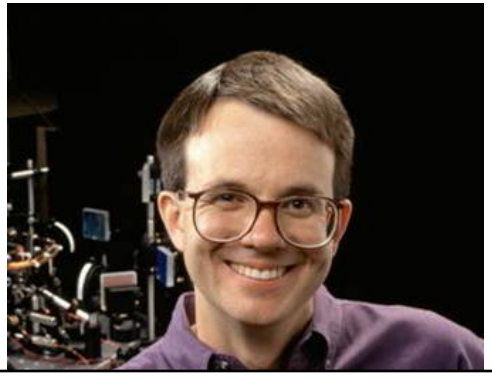
NIST works with

- **Industry**
- **Academia**
- **Other agencies**
- **Government agencies**
- **Measurement laboratories**
- **Standards organizations**

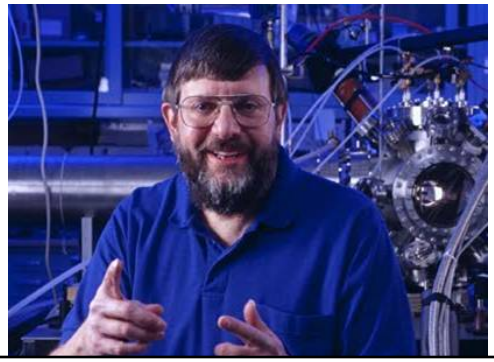


NIST has... ...world-class staff

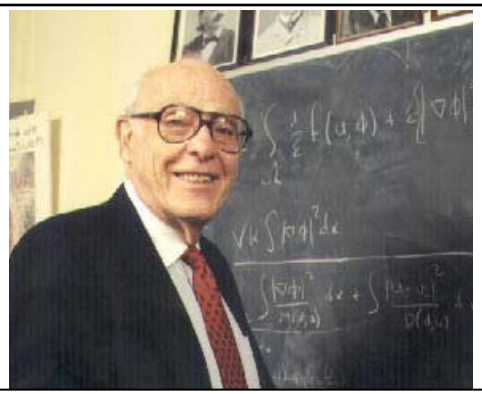
Jan Hall
2005 Nobel Prize
in Physics



Eric Cornell
2001 Nobel Prize
in Physics

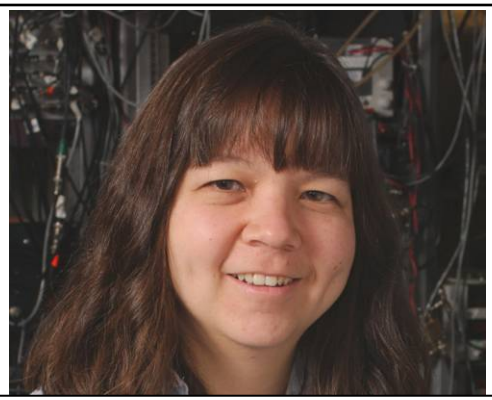


Bill Phillips
1997 Nobel Prize
in Physics



John Cahn
1998 National Medal of
Science

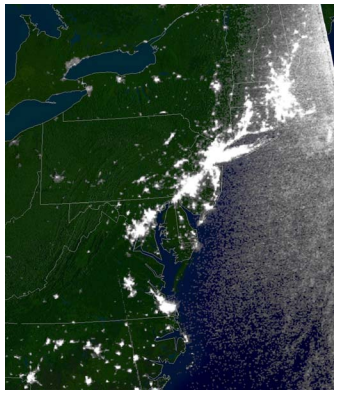
Anneke Sengers
2003 L'Oréal-UNESCO
Women in Science Award



Debbie Jin
2003 MacArthur
Fellowship

Nation's Infrastructure

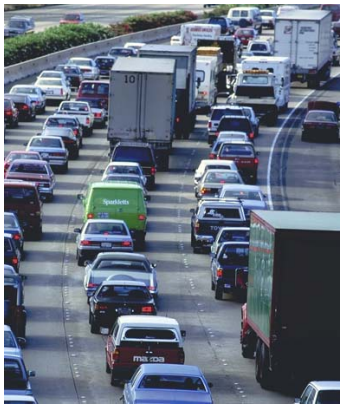
When things go well…



(Before 2003 blackout)

When things go wrong…

(During blackout)



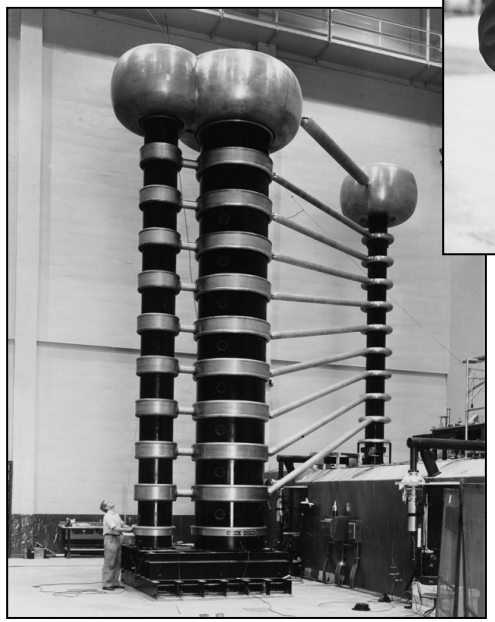
NIST Mission

To promote U.S. innovation and industrial competitiveness by advancing

measurement science,
standards, and
technology

in ways that enhance economic security and improve our quality of life

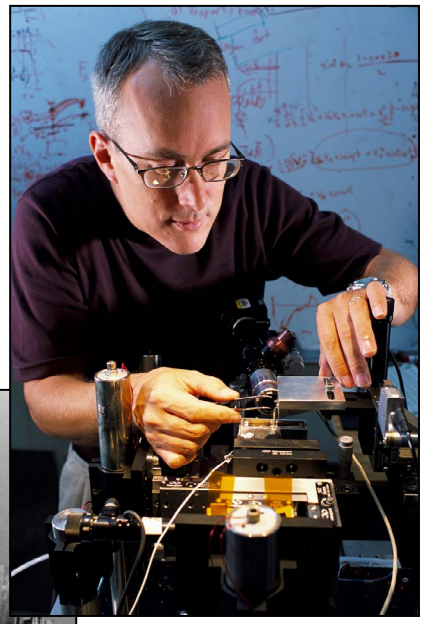
Extreme Measurements



1940

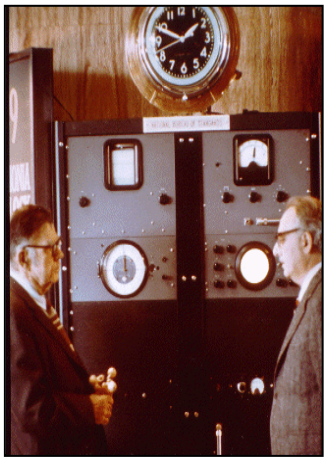
1959

1968

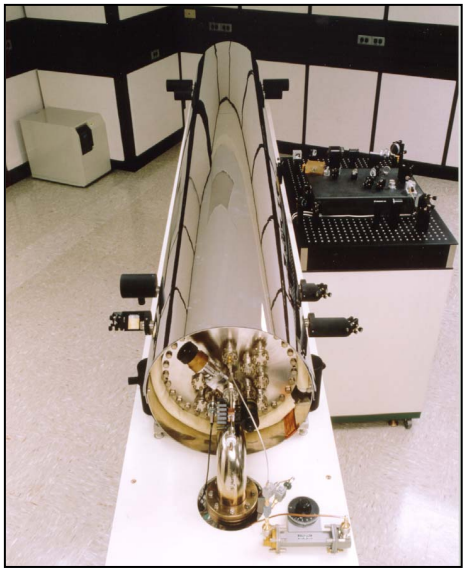


2006

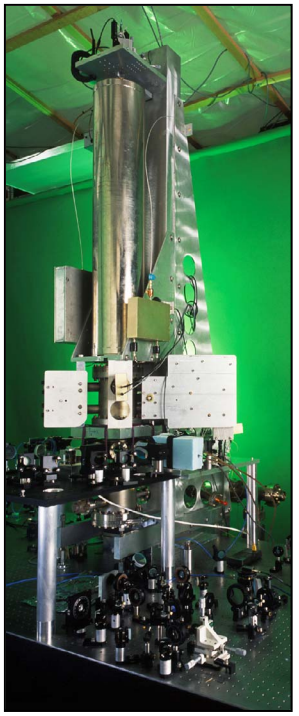
Time Marching On …



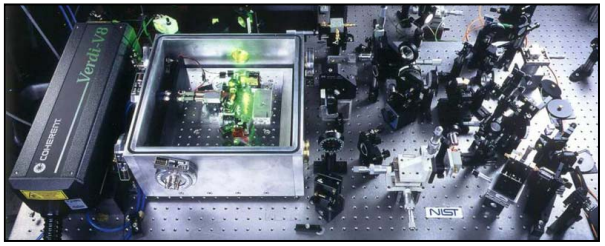
Ammonia resonator
1s in 300 years
(1949)



NIST 7
1s in 6 million years
(1993)



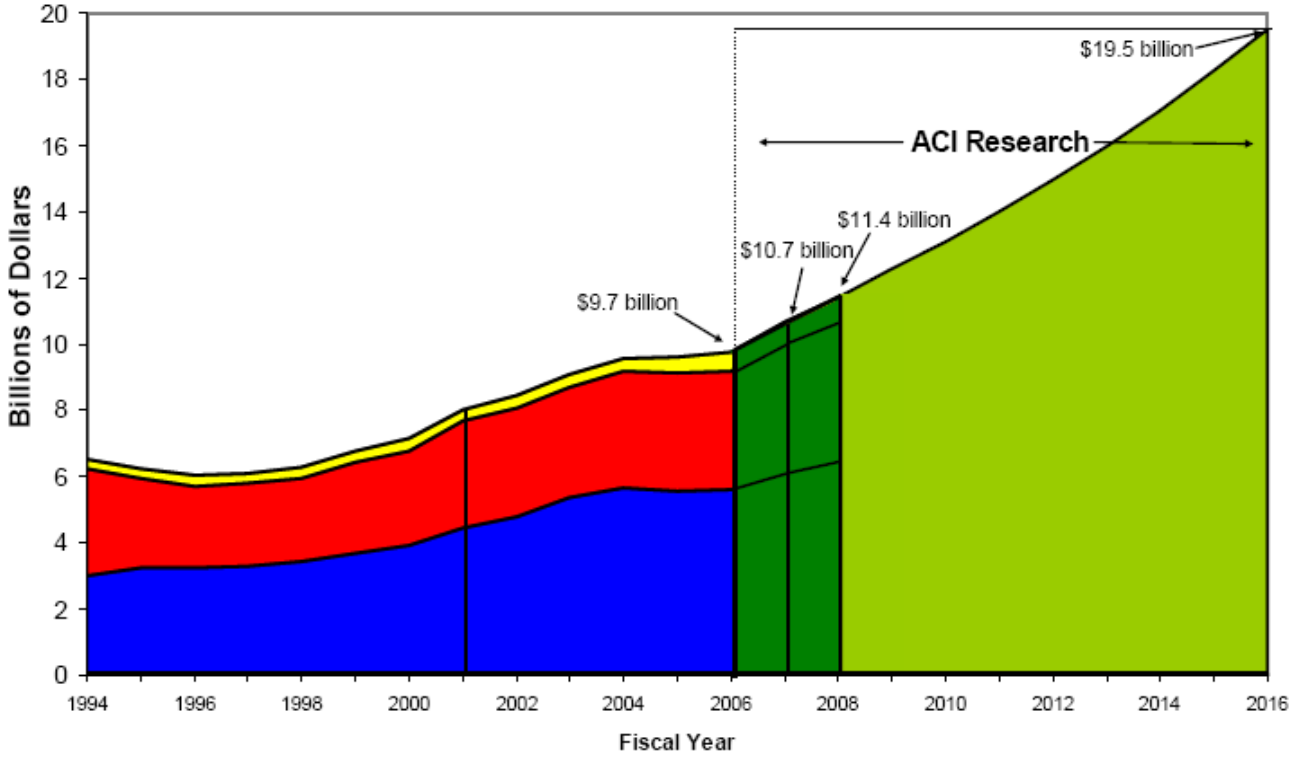
NIST F1
1s in 60 million years
(1999)



Optical clock:
Potential accuracy of
1s in 30 billion years

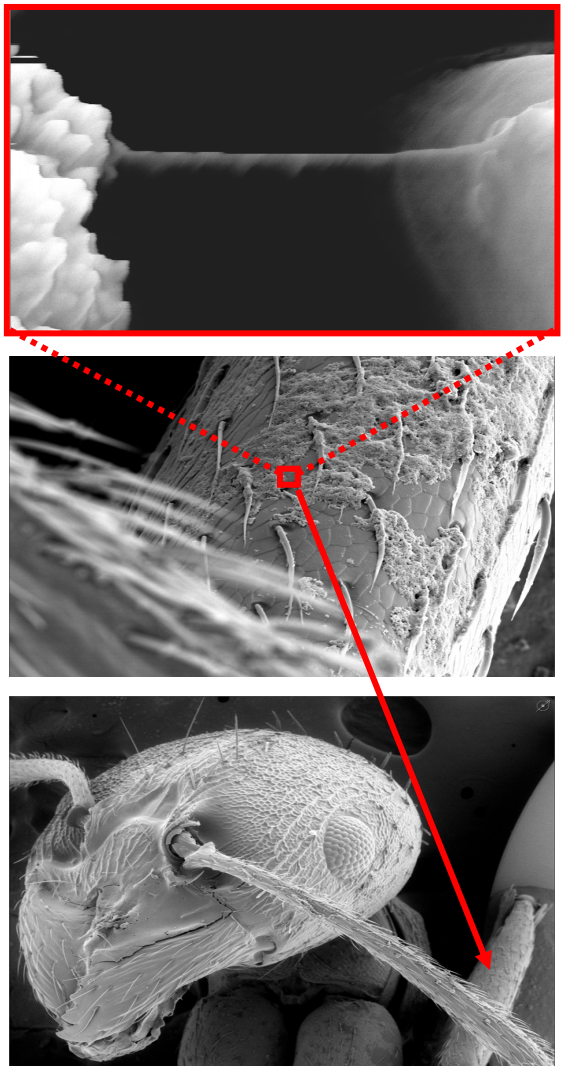
American Competitiveness Initiative (ACI)

- Proposed in FY 2007 and continued in FY 2008 budget
- Doubles, over 10 years, investment in:
  - NIST core (laboratory and infrastructure)
  - National Science Foundation
  - DOE Office of Science



Center for Nanoscale Science and Technology (CNST)

- New multidisciplinary center aimed at converting nanotechnology discovery to products
- Establish the materials and process characterization to enable scaled-up, reliable, cost effective manufacturing of nanoscale materials, structures, devices, and systems
- Partner with industry, academia, and government to turn the potential of nanotechnology into reality
- Initial focus will be on:
  - Future electronics
  - Nanofabrication and Nanomanufacturing
  - Energy



Carbon nanotube on the hair of an ant's leg

NIST Center for Neutron Research

Preservation of pharmaceuticals

National resource for neutron- based measurements

- "See" structure at the nanoscale
- Uniquely sensitive to hydrogen
- Probe magnetic structure
- Non-destructive probe

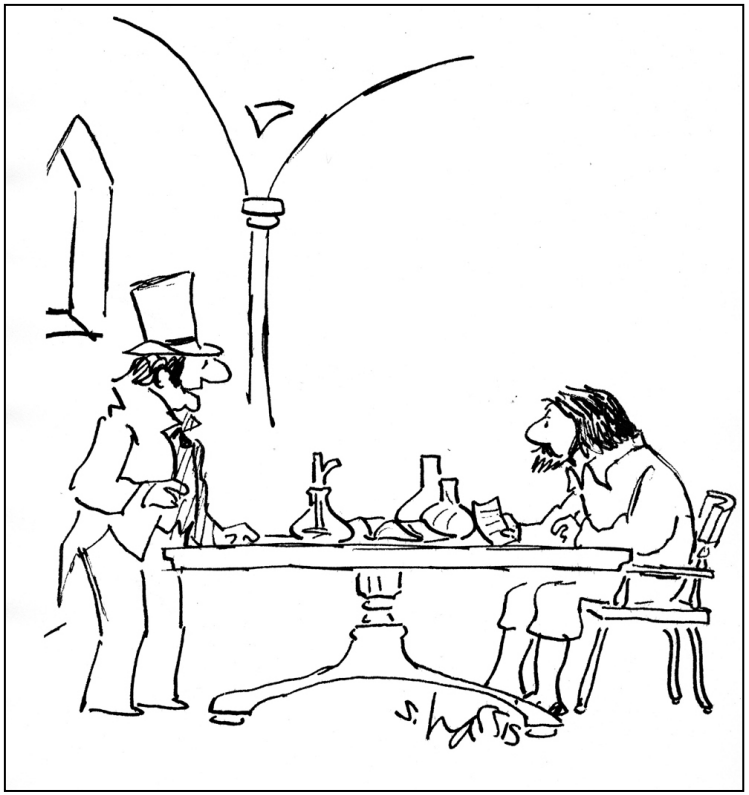
Magnetic data storage

Chemistry of cement

Petrochemicals

Fuel cells
H_2 storage materials

Scientist as Toolmaker



“Bunsen, I must tell you how excellent your study of chemical spectroscopy is as is your pioneer work in photochemistry, but what really impresses me is that cute little burner you’ve come up with.”