National Institute of Standards and Technology Research Priorities

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and Industry Services

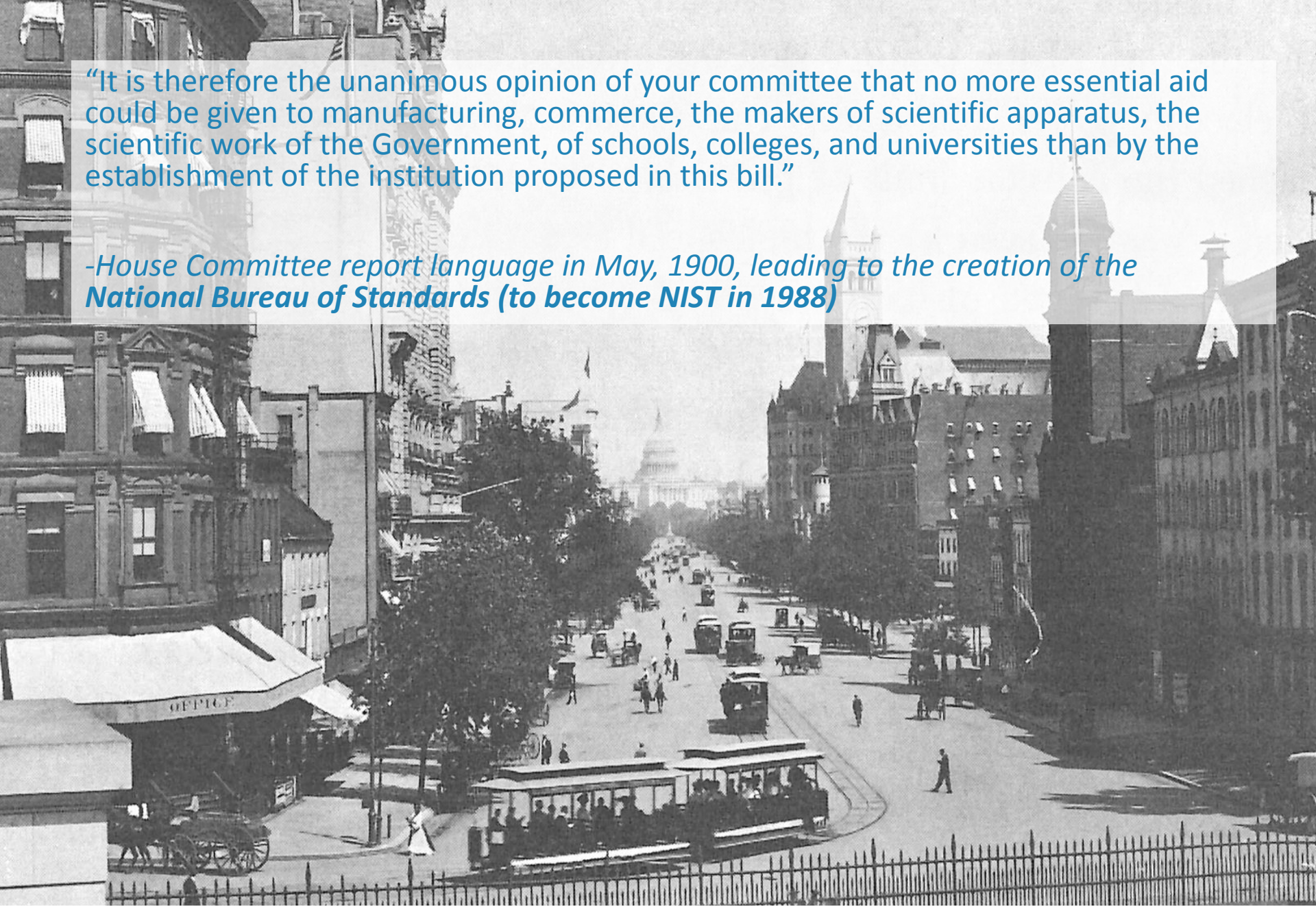
About NIST: Mission

World Leading Scientific and Engineering Research

Manufacturing Extension Partnership Centers

Program in Performance Excellence

Advanced Manufacturing National Program Office



"It is therefore the unanimous opinion of your committee that no more essential aid could be given to manufacturing, commerce, the makers of scientific apparatus, the scientific work of the Government, of schools, colleges, and universities than by the establishment of the institution proposed in this bill."

-House Committee report language in May, 1900, leading to the creation of the ***National Bureau of Standards (to become NIST in 1988)***

About NIST: Basic Facts

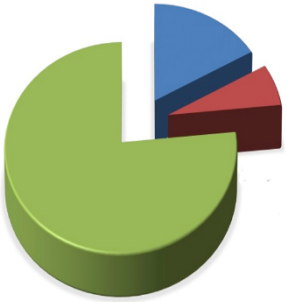
2 Large Research Campuses

Gaithersburg, MD– **62** bldgs. **578** acres
Boulder, CO—**26** bldgs., **208** acres

Partnerships In Every State

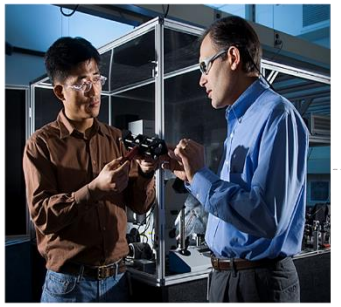
Manufacturing Extension Field Locations
Joint institutes & Centers of Excellence

FY 2015 Appropriations $864 Million



NIST labs, $**675.5 M**
Industrial Technology Services, $**138.1 M**
Construction of Research Facilities, **$50.3 M**

Additional Resources
~ **$120 M** from other government agencies
~ **$50 M** from reimbursable services



People Employees & Associates

~3,000 Employees
~3,500 Guest Researchers and other NIST Associates

NIST Laboratory Programs

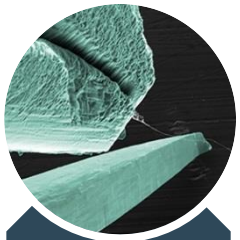
Material Measurement Laboratory

Physical Measurement Laboratory

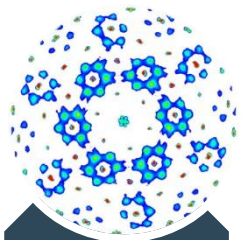
Engineering Laboratory

Information Technology Laboratory

Communication Technology Laboratory



Center for Nanoscale Science and Technology



NIST Center for Neutron Research

Metrology Laboratories

Driving innovation through Measurement Science and Standards

Technology Laboratories

Accelerating the adoption and deployment of advanced technology solutions

National User Facilities

Providing world class, unique, cutting-edge research facilities

NIST supports national priority areas

Advanced Manufacturing

- Precision Measurements
- Bio and nanomanufacturing
- Smart Manufacturing
- Advanced Materials

Cybersecurity

Advanced Communications

Cyber-Physical Systems & Smart Cities

Precision Medicine

Synthetic Biology

Forensic Science

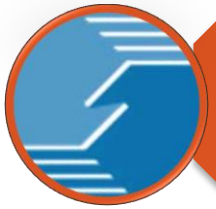
Climate Change and Clean Energy

NIST Research Trends

Precision Measurements

Systems

Data and Modeling



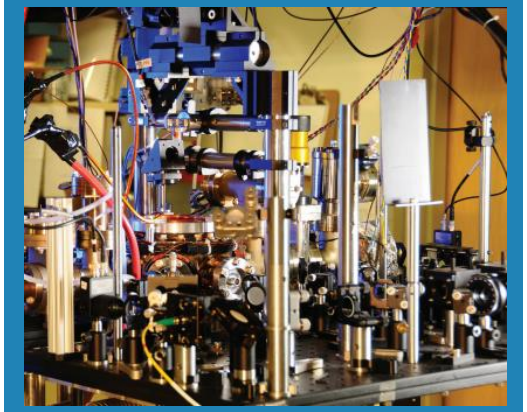
Collaboration and Partnerships

Photonics

- Photonics technologies are critically important to advanced manufacturing and advanced communications

- NIST is working to advance:
  - Photonics metrology and technology for industry
  - Application of high-intensity light sources in manufacturing and materials processing
  - Use of photonics for health care

Applications include 3D imaging for quality monitoring and control, and macroscopic and atomic-scale probing of materials



NIST's ultra stable Ytterbium Atomic Clock
Credit: Burrus/NIST

Disaster Resilience

- There is a need to better manage disaster risks from natural, technological, and human-caused hazards

- NIST is working to develop the measurement science to address:
  - hazard events
  - material performance in buildings and infrastructure

Disaster-related losses in the US average in excess of $57 billion annually

Aerial view of shows damage to the New Jersey Coast from Hurricane Sandy (Oct. 2012)
Credit: U.S. Air Force photo by Master Sgt. Mark Olsen

Public Safety Communications Research

- NIST is working with the Institute of Telecommunication Sciences in research, development, testing and evaluation to foster nationwide first-responder communications interoperability
- The PSCR program involved public safety practitioners – fire, police, and EMS – directly in its research and development activities
- Research areas include:
  - Public safety broadband communications
  - Public safety audio and video quality

Dereck Orr with a variety of radios and cell phone used in PSCR research.
Credit: Burrus / NIST

Future Computing Technologies

- Growth in both basic and applied aspects of new computing technologies has far-reaching industrial applications, national security implications, and economic benefits

- NIST will support the National Strategic Computing Initiative by:
  - Developing the measurement science for physical and materials aspects of future computing
  - Addressing potential logic, memory, storage, and systems concepts needed
  - Developing the measurement science to support alternative computational paradigms
  - Developing the measurements, standards, and guidelines for reliability, robustness and security

Executive Order 13702, Creating a National Strategic Computing Initiative directs NIST to expand its capabilities to support US leadership in high-performance computing

A Blue Gene/P supercomputer at Argonne National Laboratory
Credit: Argonne National Laboratory

Partnering with NIST

Collaborative Research

Use of Designated Facilities

- NIST Center for Neutron Research
- NIST NanoFab

Grants Programs

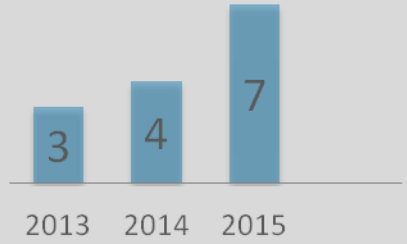
Small Business Innovation Research Program

Student Programs

NIST Engagement with Texas Universities

SWAN
Southwest Academy of Nanoelectronics

led by the **University of Texas at Austin,** includes members from **UT-Dallas, Texas A&M,** Harvard, North Carolina State, UC-San Diego



Summer Undergraduate Research Fellowship (SURF) Students from Texas

130 **students from Texas universities since 2011**

The Center for Risk Based Community Resilience Planning includes a multi-disciplinary team from **Rice University, Texas A&M University, and Texas A&M-Kingsville**

$11.1 M **to Rice University** in construction grants for the Brockman Hall for Physics (2009)

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

NIST Engagement with Texas Companies

3 Small Business Innovation Research awards to Texas small businesses for R&D*

Technology Partnerships Office

cooperative research and development agreements issued* **39**

115+

contracts with companies based in Texas

$19.5 M

funded by

TIP Technology Innovation Program

MEP • MANUFACTURING EXTENSION PARTNERSHIP

2013-2015

Texas Instruments plays a major role in the **Nanoelectronics Research Initiative (NRI)**

Over 5 years, NIST will provide the NRI **$2.6 M**

What is AMTech?

The Advanced Manufacturing Technology Consortia (AMTech) Program

Launched by NIST in FY 2013

- To incentivize the formation of and provide resources to industry-driven consortia
  - To support basic and applied research
  - On long-term, pre-competitive and enabling technology development
- For the U.S. manufacturing industry
- $15M annual program

AMTech-supported consortia will strengthen the capacity of U.S. industry and the nation to compete in global markets

AMTech Portfolio

35 funded awards

AMTECH
Advanced Manufacturing Technology Consortia

federal funds obligated **$17M**

Texas Involvement

1 award recipient

Advanced Superconductor Manufacturing Institute (2014 Competition)

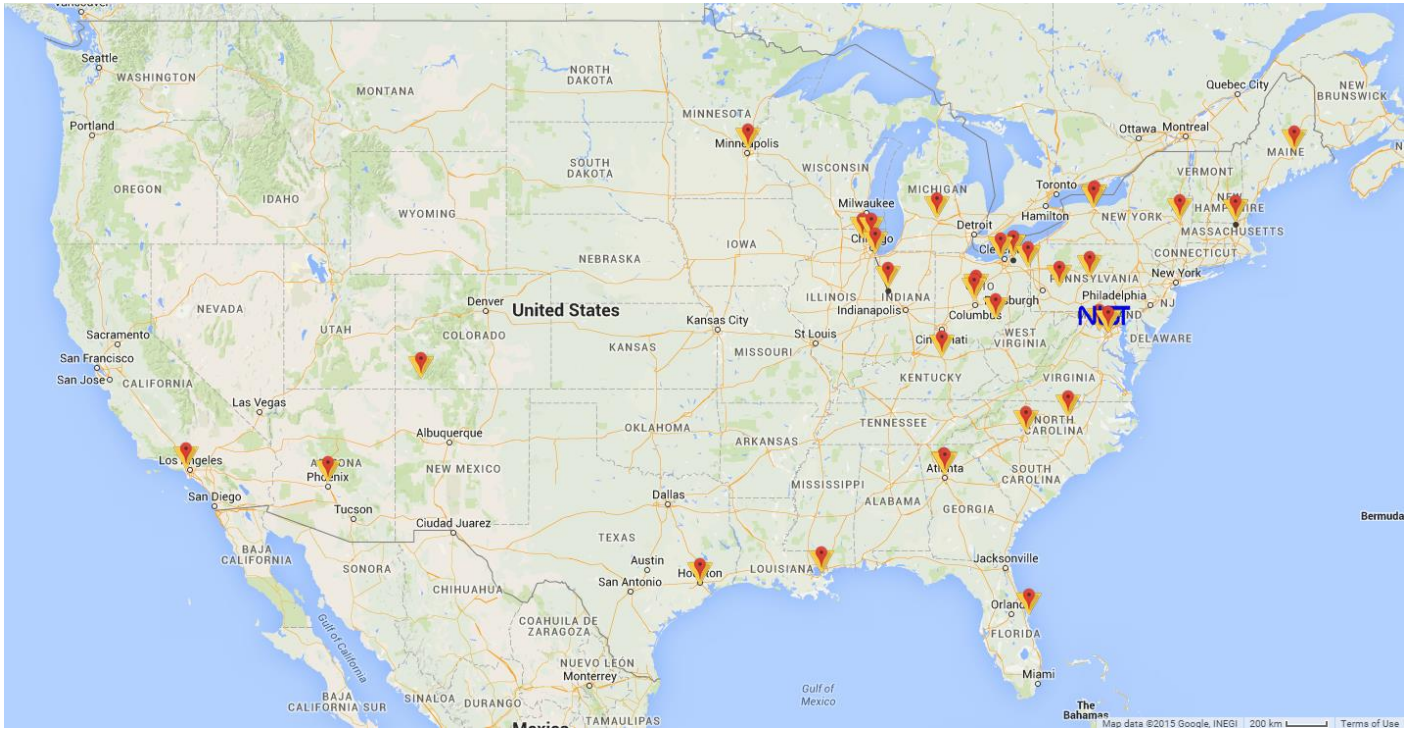
2 contractors across 2 awards

20 unfunded collaborators across 10 awards*

*as identified in proposal

2013 & 2014 AMTech Planning Grants

- Interactive, dynamic consortia map of awardees, funded partners, and collaborators live on NIST AMTech website (http://www.nist.gov/amo/amtech/index.cfm)
  - Project brief, logo, location and contact information for every recipient



National Network for Manufacturing Innovation

- Proposed network of 45 Institutes for Manufacturing Innovation
- Will bring together companies, universities and community colleges, and government to develop technologies and capabilities that US manufacturers can apply in production
- Institutes will be self-sustaining

Members of Current Institutes

U. North Texas (2 institutes)
UT Austin (3)
Southwest Research Inst. (2)
Novacentrix
Siemens Product Lifecycle Management Software
Fujitsu Network Communications, Inc.
Dimensional Metrology Standards Consortium
UT El Paso (satellite location of America Makes)
FibrTec
Wetzel Engineering
XFAB

Existing Institute focus areas

- Advanced Composites (DOE)
- Digital Manufacturing (DOD)
- Lightweight Metals (DOD)
- Power Electronics (DOE)
- Additive Manufacturing (DOD)
- Flexible Electronics (DOD)
- Photonics (DOD)
- Smart Manufacturing* (DOE)
- Fibers & Textiles* (DOD)

** In progress*

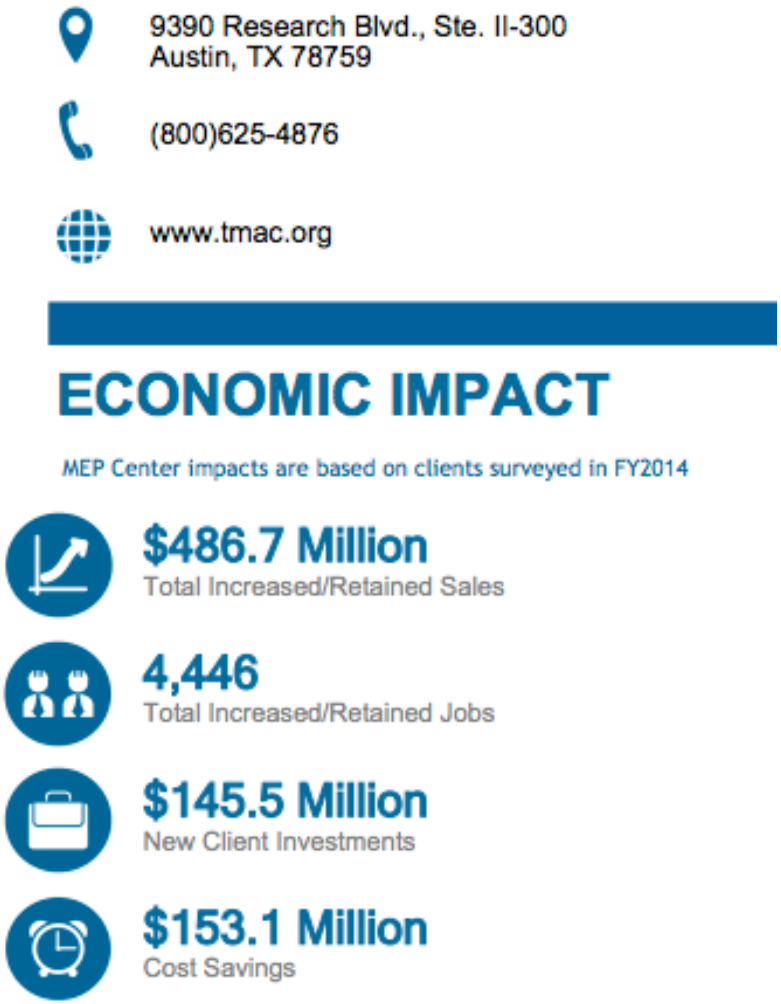
Texas Manufacturing Assistance Center (TMAC)

- NIST MEP affiliate for the state of Texas
- Provides technical assistance and training to Texas manufacturers
- Focuses on Lean Enterprise, technology solutions, strategic management, quality systems, environment and safety
- 5 year funding amounts:
  - $33,504,405 in federal funds
  - $41,188,677 in non-federal funds

9390 Research Blvd., Ste. II-300
Austin, TX 78759

(800)625-4876

www.tmac.org



TMAC's Public-Private Partnership

The program is hosted by the following partner institutions:

- **The University of Texas at Arlington**
- The Texas Engineering Extension Service (TEEX), part of The Texas A&M University System
- The University of Texas at El Paso
- The University of Texas – Rio Grande Valley
- Texas Tech University
- Southwest Research Institute
- BeehiveFund

Thank you.

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