

NIST: Measurement Science, Standards and Emerging Technologies

Walter G. Copan

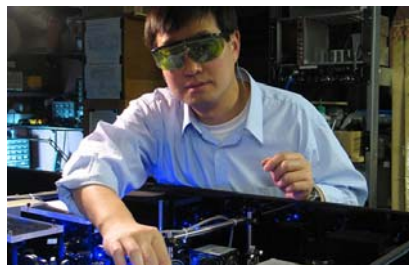
Under Secretary of Commerce for Standards and Technology,
and NIST Director

May 14, 2018

NIST Mission

NIST

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



NIST

Measurements are
essential to
commerce, trade,
and innovation

Federal role
established in the
U.S. Constitution

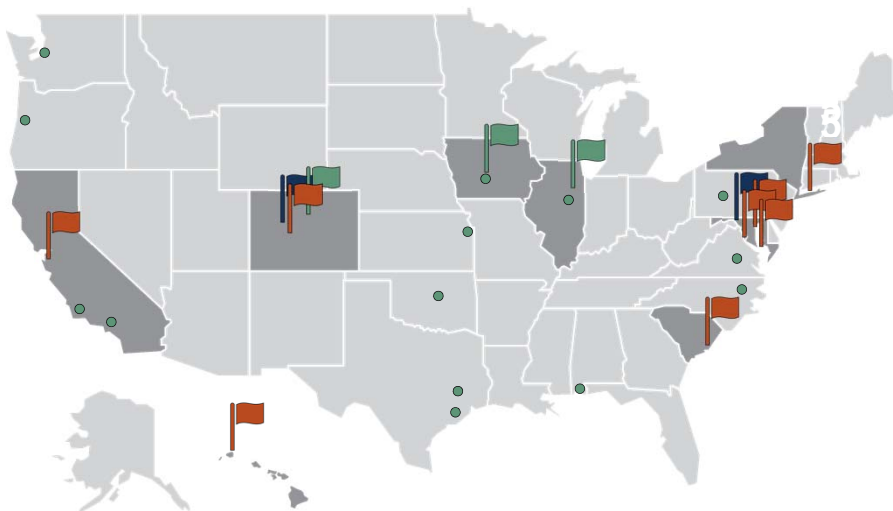


NIST AT A GLANCE

Industry's National Laboratory

 <p>3,400+ FEDERAL EMPLOYEES</p>	 <p>5 NOBEL PRIZES</p>	 <p>2 CAMPUSES GAITHERSBURG, MD [HQ] BOULDER, CO</p>
 <p>3,500+ ASSOCIATES</p>	 <p>10 COLLABORATIVE INSTITUTES</p>	 <p>400+ BUSINESSES USING NIST FACILITIES</p>

NIST and Joint Institute Locations



NIST Campuses

Joint Institutes and Centers

- National Cybersecurity Center of Excellence
- Institute for Bioscience & Biotechnology Research
- Joint Institutes for Quantum and Computer Science
- JILA
- Hollings Marine Lab
- Brookhaven National Lab
- Joint Initiative for Metrology in Biology
- NIST Hawaii Atomic Clock Signal Station

NIST Centers of Excellence

- Forensic Science
- Disaster Resilience
- Advanced Materials

Unique NIST Products and Services



1200 Standard Reference Material (SRM) products

100 Standard Reference Data (SRD) products

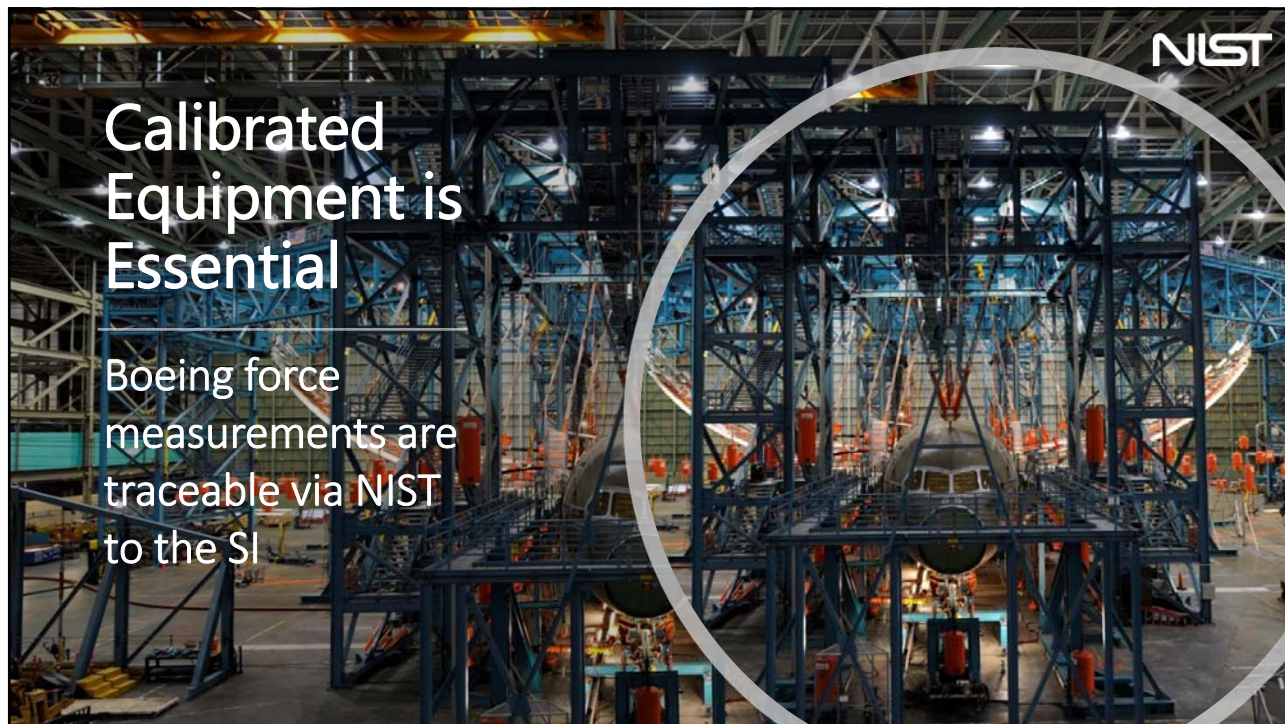
600 measurement services

Every year:

32,000 SRM units sold

13,000 calibrations and tests

800 accreditations of testing and calibrations laboratories



Documentary Standards

NIST

NIST SPECIAL PUBLICATION 1800-8

Securing Wireless Infusion Pumps In Healthcare Delivery Organizations

Includes Executive Summary (A), Approach, Architecture, and Security
Characteristics (B), and How to Verify (C)

Authors:
Derek O'Brien
Brian Edwards
Karin Lofgren
Brett Mitchell
Dan Miller
Katherine Young

CS001

This publication is available free of charge from:
<http://www.nist.gov/publications/securing-wireless-infusion-pumps>



IEEE STANDARDS ASSOCIATION



American National Standard for Evaluation of Wireless Coexistence

C63[®]

Accredited Standards Committee C63—Electromagnetic Compatibility

Accredited by the
American National Standards Institute

ANSI
11 Dupont Avenue
New York, NY 10119-1700

ANSI C63.27-2017

Information on this standard is available at <http://www.nist.gov/publications/securing-wireless-infusion-pumps>. For more information, contact the NIST Technical Services Division at tsd@nist.gov.

Important Role

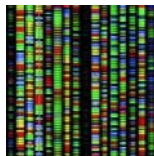
400+ NIST technical staff in
100+ standard committees

Leadership in **international
standards** bodies

NIST's technical expertise
results in improved standards
and U.S. competitiveness

NIST Laboratory Programs

NIST



Material
Measurement
Laboratory



Physical
Measurement
Laboratory



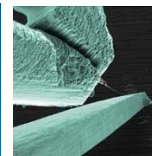
Engineering
Laboratory



Information
Technology
Laboratory



Communication
Technology
Laboratory



Center for
Nanoscale
Science and
Technology



NIST Center
for Neutron
Research

Strategic Priorities, National Impacts

NIST



Cybersecurity / Cryptography

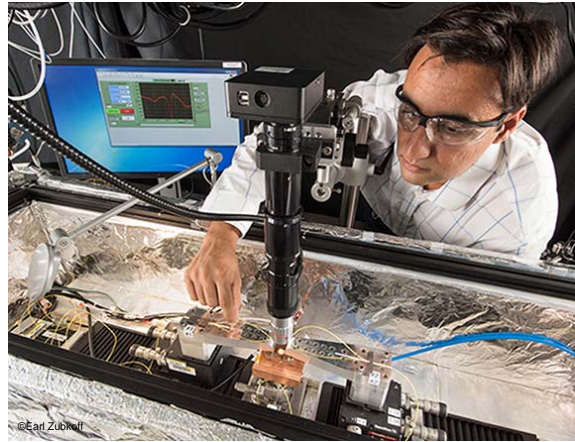


Advanced Manufacturing

Strategic Priorities, National Impacts

NIST

Bioeconomy



Quantum Science

Strategic Priorities, National Impacts

NIST

Artificial Intelligence /
Machine Learning



Internet of Things

NIST and Emerging Technologies

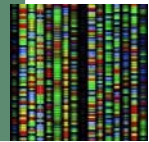
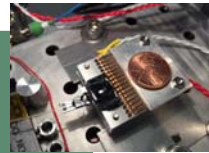
NIST

To promote U.S. innovation and industrial competitiveness



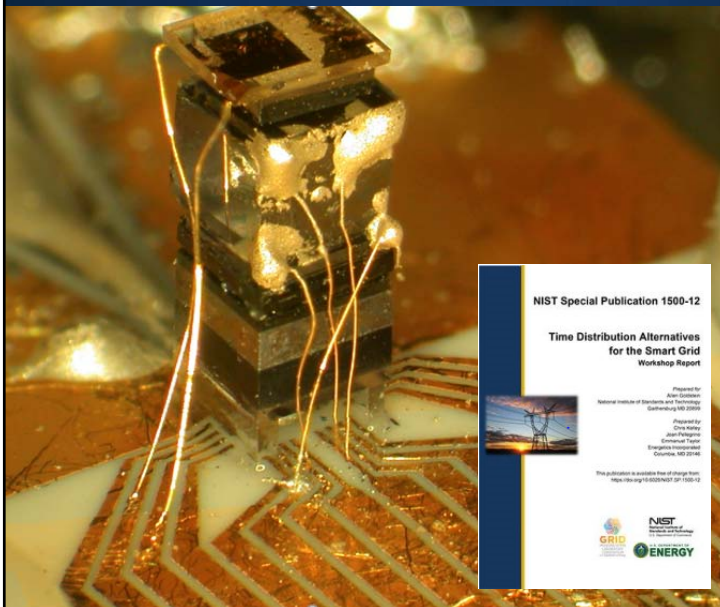
- Advanced Computing
- Neuromorphic computing
- Advanced materials
- Polymeric composite systems

- Gene Editing
- Biomanufacturing
- Advanced micro- and nanoelectronics
- Additive manufacturing



Precision Navigation and Timing

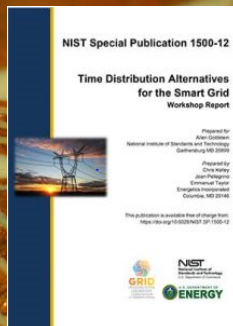
NIST



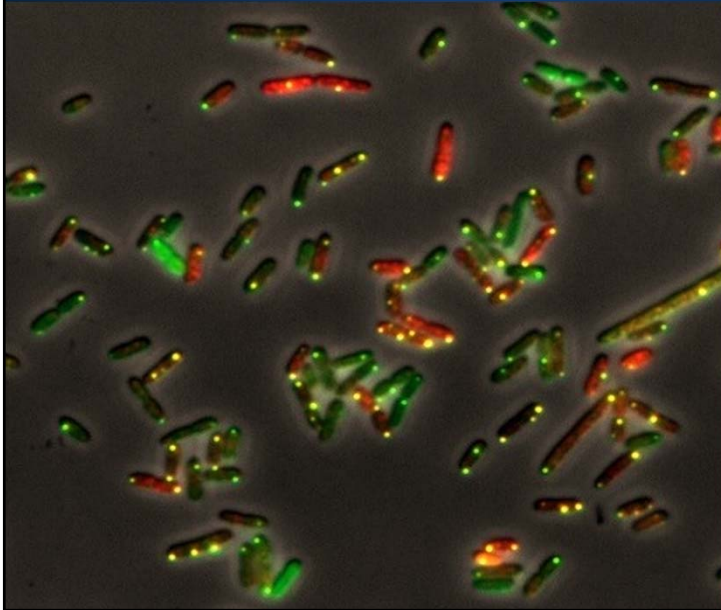
NIST Chip-Scale Atomic Clock

Is the size of a computer chip with a precision timing synchronization to about 1 billionth of a second per day

NIST improved the devices to a 10^{-12} uncertainty before transferring the technology to commercial manufacturers



Synthetic Biology

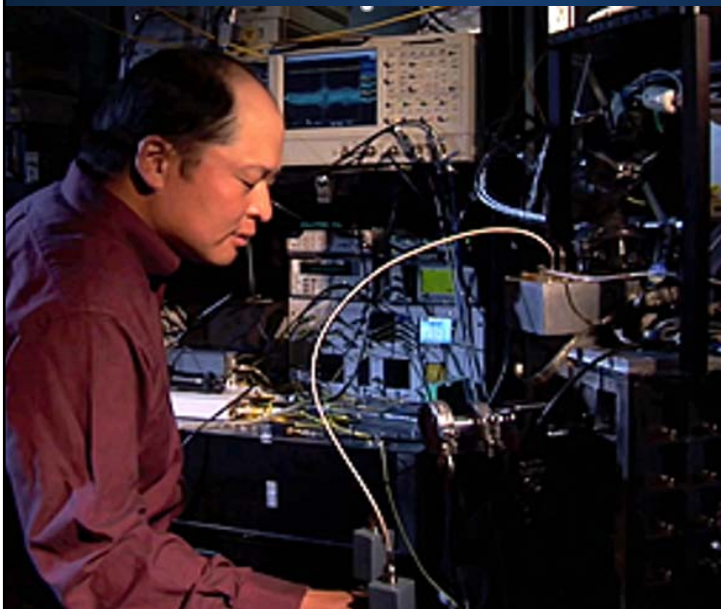
NIST

NIST Genetic Sensor Foundry

Will **quantitatively and reproducibly predict** how cells measure their environment, make decisions, and respond

NIST's technical expertise is having a transformative impact on synthetic biology

Quantum Sensors

NIST

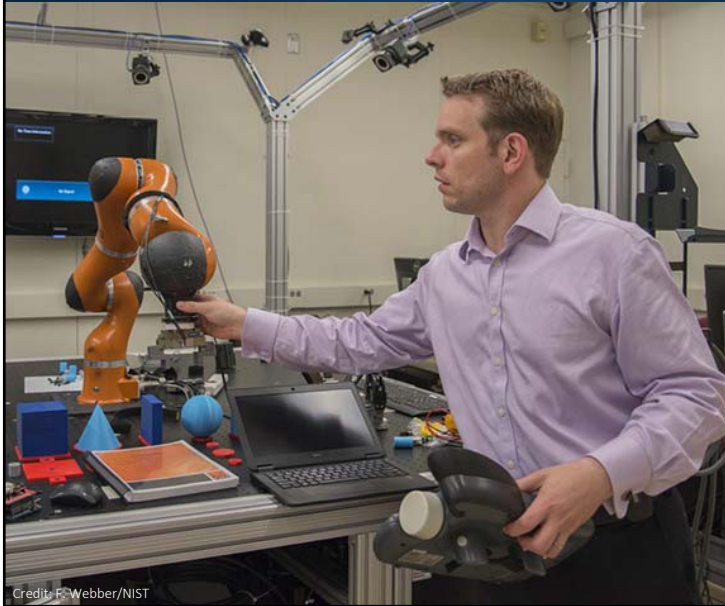
NIST Single Photon Detector

Will secure long-distance data transmission against unwanted interception. Advance quantum computation

NIST has developed world's most efficient single photon detector.

Advanced Robotics

NIST



Credit: F. Webber/NIST

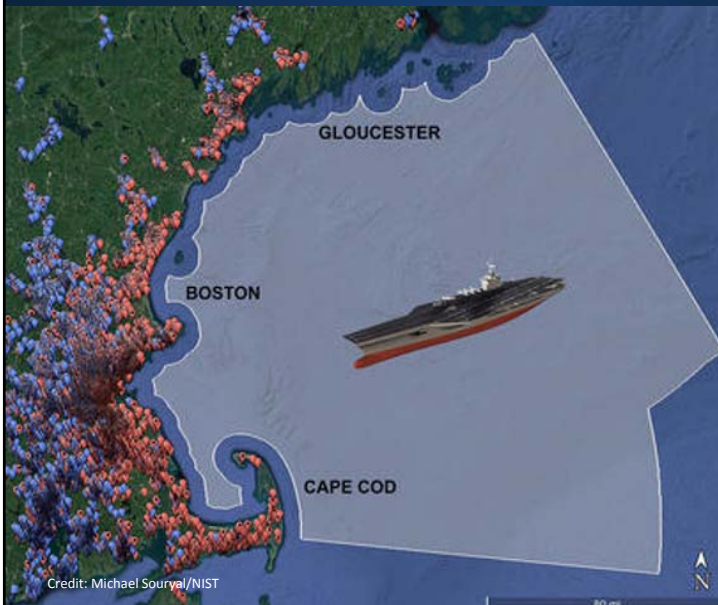
NIST **Human-Robot Interaction**

Developed metrics, test methods, and safety standards for the deployment of robots in industrial settings

NIST provides an internationally respected voice in developing standards for collaborative robots, e.g., safety: ISO/TS 15066

Advanced Communications Technologies

NIST



Credit: Michael Souryal/NIST

NIST **Spectrum Sharing**

Foundational measurement science for advanced communications (5G wireless, Internet of Things, Public Safety applications, ...)

NIST plays a major role in the development of standards, test procedures and certification tools in the wireless spectrum forum



NIST plays an essential Federal government role by developing new measurements, standards and technologies for emerging markets

Thank you