February 12, 2020

Session I: NIST Update

Session II: NIST Budget Update 2020 Enacted and 2021 Request

Session III: NIST Programmatic Priorities

Session IV: NIST Facilities Priorities

Session V: Efforts to Strengthen the NIST Environment

February 13, 2020

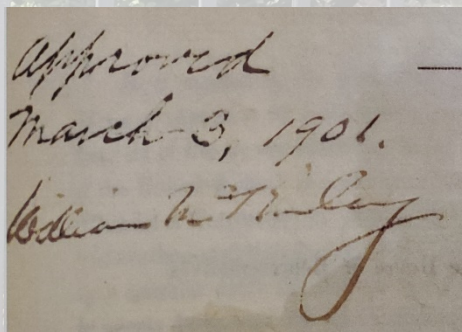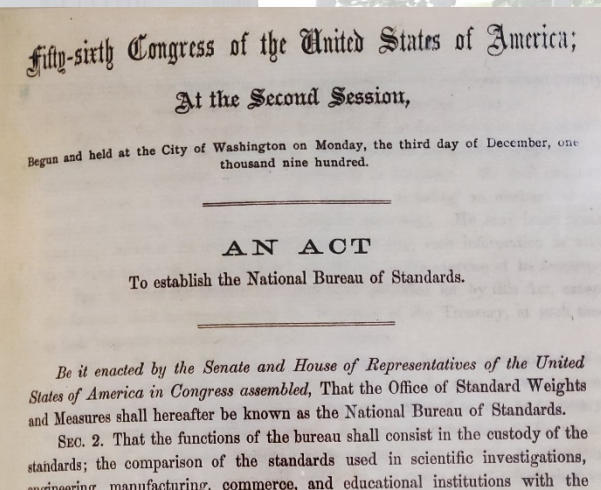Session VI: VCAT Working Session

NIST Update

- Agenda Review
- NIST Leadership Changes
- Budget Update
- Recent NIST Highlights
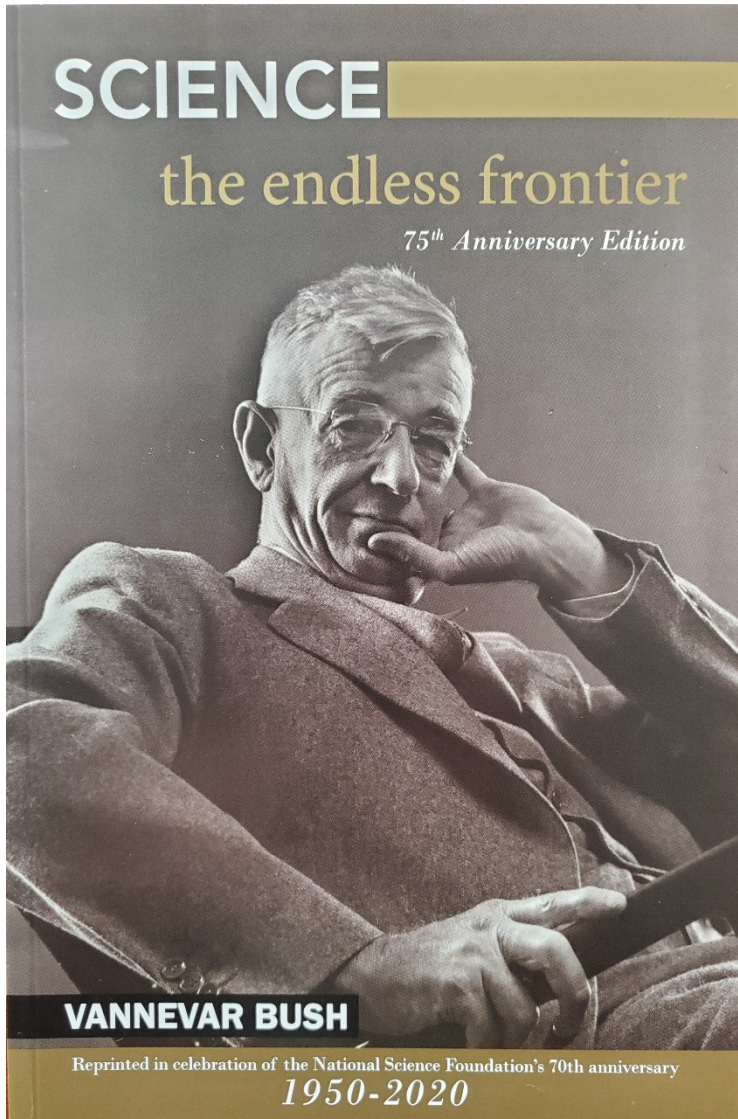- My FY2020 Priorities
- Recent Awards

NIST 120 Years
March 3, 2021

Planning a celebration to commemorate the anniversary of the founding of

The National Bureau of Standards / NIST – 1901.

Fifty-sixth Congress of the United States of America;

At the Second Session,

Begun and held at the City of Washington on Monday, the third day of December, one thousand nine hundred.

Approved
March 3, 1901.
William McKinley

AN ACT

To establish the National Bureau of Standards.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Office of Standard Weights and Measures shall hereafter be known as the National Bureau of Standards.

SEC. 2. That the functions of the bureau shall consist in the custody of the standards; the comparison of the standards used in scientific investigations, engineering, manufacturing, commerce, and educational institutions with the

VCAT – A Historic Perspective

VANNEVAR BUSH
Reprinted in celebration of the National Science Foundation's 70th anniversary
1950-2020

- VCAT chartered March 3, 1901 with the establishment of NBS / NIST in law

SEC. 10. That there shall be a visiting committee of five members, to be appointed by the Secretary of the Treasury, to consist of men prominent in the various interests involved, and not in the employ of the Government. This committee shall visit the bureau at least once a year, and report to the Secretary of the Treasury upon the efficiency of its scientific work and the condition of its equipment. The members of this committee shall serve without compensation, but shall be paid the actual expenses incurred in attending its meetings. The
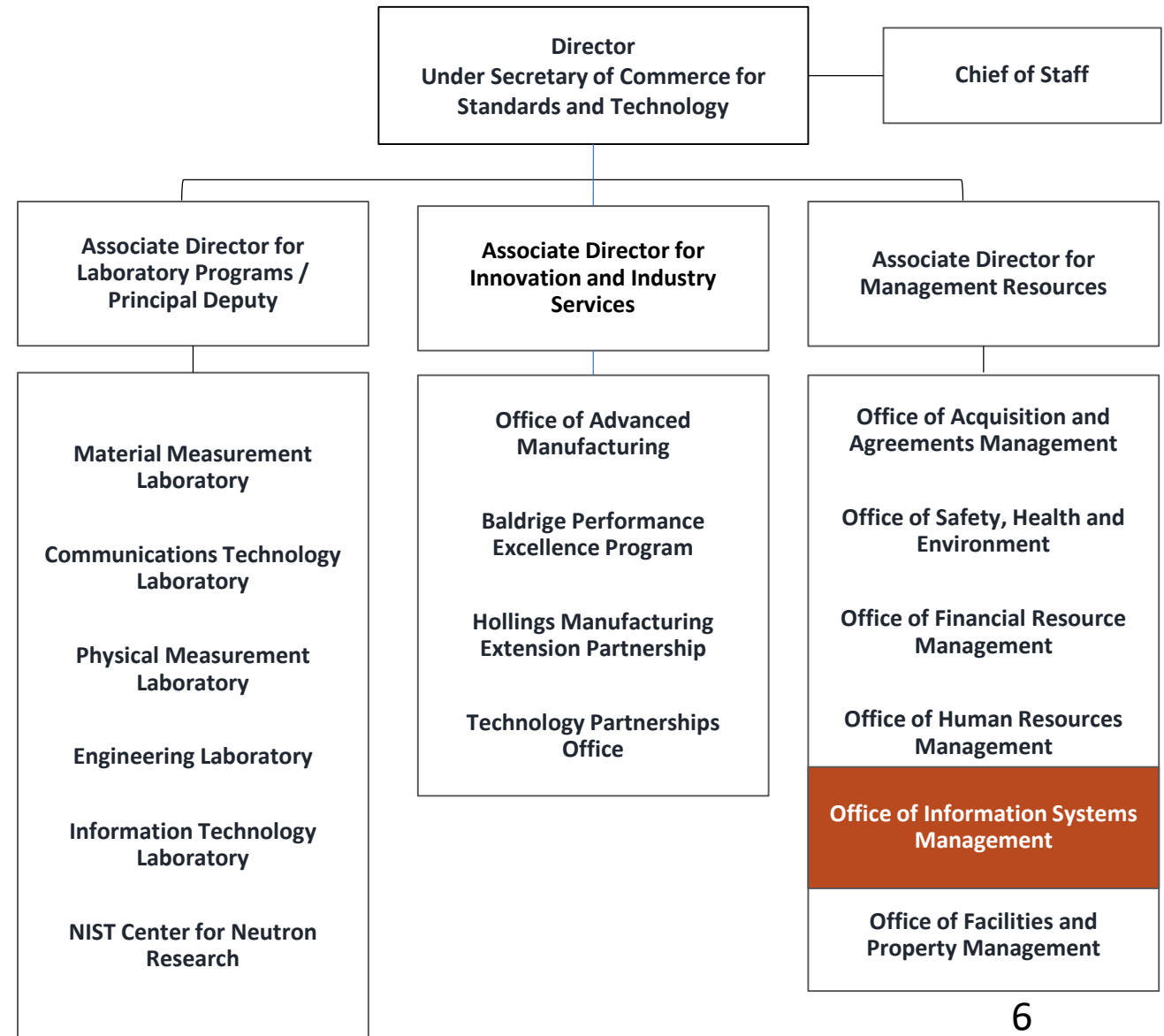
- Vannevar Bush served on the NBS VCAT from 1942 – 1946, during which period he also led writing *"Science – The Endless Frontier"*

- Bush emphasized basic research, its impacts and the importance of translation into innovation, leading to establishment of NSF and advancing U.S. science & technology policy and leadership

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NIST Leadership Changes

NIST

New Chief Information Officer

Dr. Chandan Sastry

- From NIH where he was Director of Clinical Research Informatics.

- More than 25 years of experience, leading technology and strategic management projects to support research organizations.
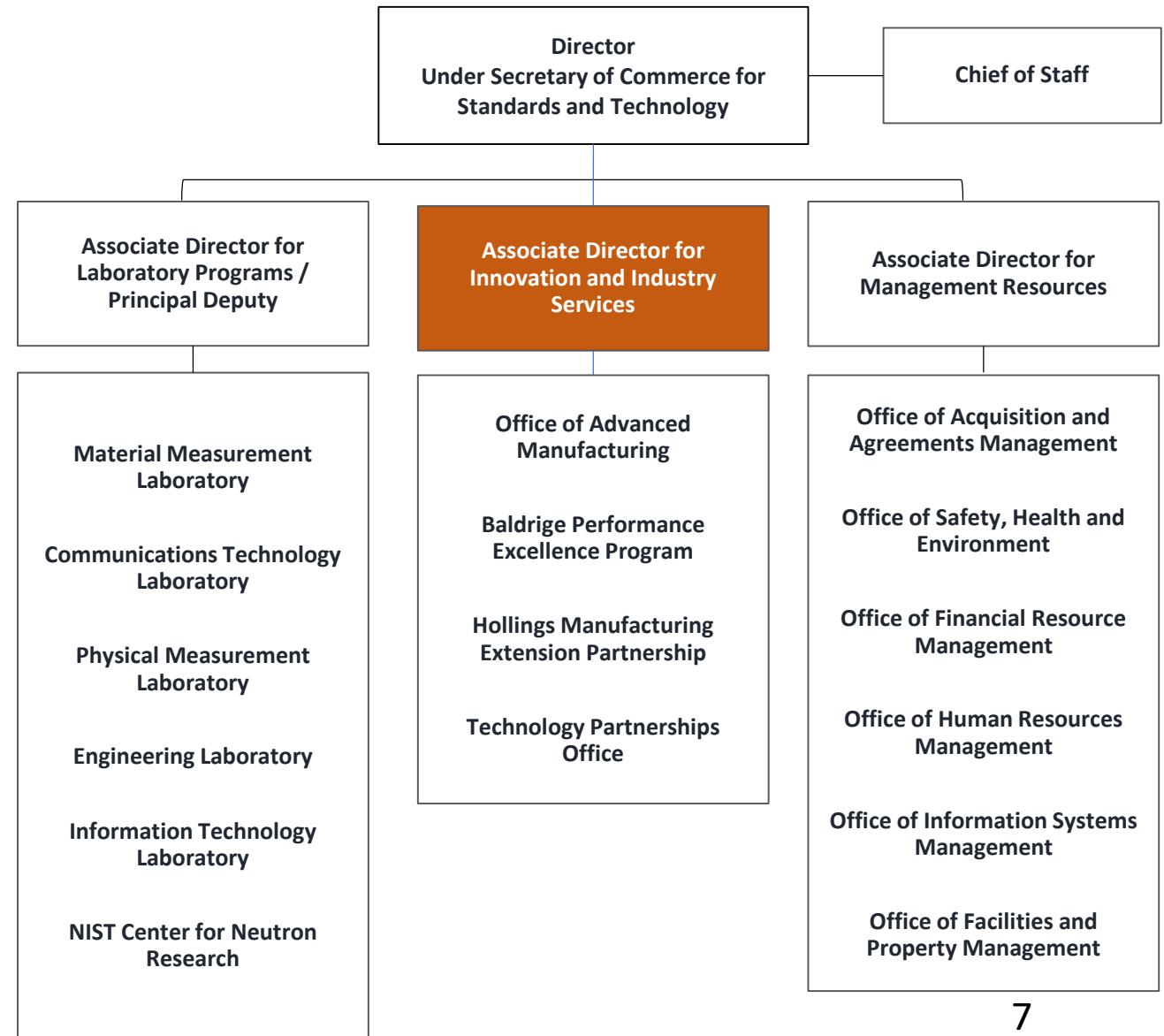

Director
Under Secretary of Commerce for Standards and Technology

Chief of Staff

Associate Director for Laboratory Programs / Principal Deputy

Associate Director for Innovation and Industry Services

Associate Director for Management Resources

Material Measurement Laboratory

Communications Technology Laboratory

Physical Measurement Laboratory

Engineering Laboratory

Information Technology Laboratory

NIST Center for Neutron Research

Office of Advanced Manufacturing

Baldrige Performance Excellence Program

Hollings Manufacturing Extension Partnership

Technology Partnerships Office

Office of Acquisition and Agreements Management

Office of Safety, Health and Environment

Office of Financial Resource Management

Office of Human Resources Management

Office of Information Systems Management

Office of Facilities and Property Management

NIST Leadership Changes: Retirement

Associate Director for Innovation and Industry Services

Dr. Phillip A. Singerman

- Joined NIST January 2011 after extensive career in technology based economic development

- Respected leader for U.S. innovation, technology transfer and manufacturing competitiveness.

- Interviews for successor underway

Director
Under Secretary of Commerce for Standards and Technology

Chief of Staff

Associate Director for Laboratory Programs / Principal Deputy

Associate Director for Innovation and Industry Services

Associate Director for Management Resources

Material Measurement Laboratory	Office of Advanced Manufacturing	Office of Acquisition and Agreements Management
Communications Technology Laboratory	Baldrige Performance Excellence Program	Office of Safety, Health and Environment
Physical Measurement Laboratory	Hollings Manufacturing Extension Partnership	Office of Financial Resource Management
Engineering Laboratory	Technology Partnerships Office	Office of Human Resources Management
Information Technology Laboratory		Office of Information Systems Management
NIST Center for Neutron Research		Office of Facilities and Property Management

NIST Budget

NIST is operating under, planning for, and developing budgets for three fiscal years

FY20 Enacted

FY21 In Development

FY22 Early Stages

NIST BUDGET

	FY 2019 Enacted	FY 2020 Enacted	FY 2021 Pres. Request
Laboratory Programs (STRS)	$724.5	$754.0	$652.0
Hollings Mfg Ext Partnership (MEP)	$140.0	$146.0	$0.0
Manufacturing USA	$15.0	$16.0	$25.3
Construction & Renovation	$106.0	$118.0	$60.2
Total	**$985.5**	**$1034.0**	**$737.5**

Physical Security Update

100% Badge scanning at all gates

Cyber Lock installation

NCNR-Secure Guarded Information (SGI) training provided to OSY

National Terrorism Advisory System response protocols developed for four sites

Privacy Framework Released 01/16/2020

NIST

Using the Privacy Framework:

- Manage privacy risk among different organizational roles in the data processing ecosystem

- Establish or improve a privacy program using a Ready, Set, Go model; and,

- Strengthen organizational accountability through collaboration and communication.

Face Recognition Evaluation

Broad participation by industry.

Broad coverage by media including The Economist.

Report on demographics performance.

Hearings: House Committee on Oversight and Gov. Reform & Committee on Homeland Security.

Shape Shifting Sensors To Catch Early Signs of Cancer

NIST-tested tiny geometrically encoded magnets (GEMs) can detect diseases deep within the body.

Just one-hundredth as wide as a human hair, the tiny GEMs change shape based on their environment.

GEMs can detect slight changes in pH which can be caused by cancer cells.

Food Safety Workshop

Each year pathogens cause
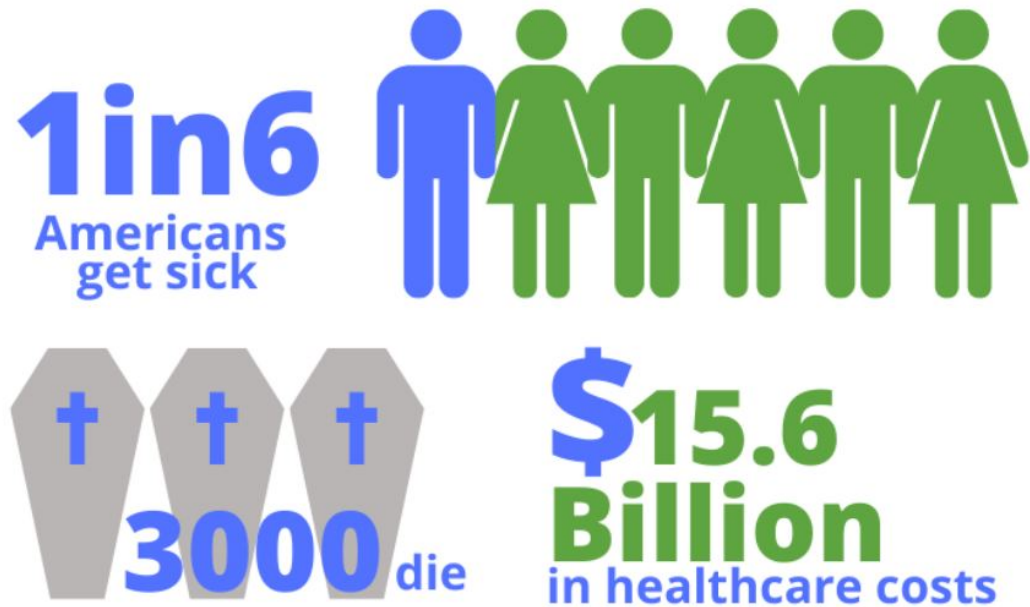
From Reference Materials to Workshop

One Lab → One NIST → One World

What is in your food?
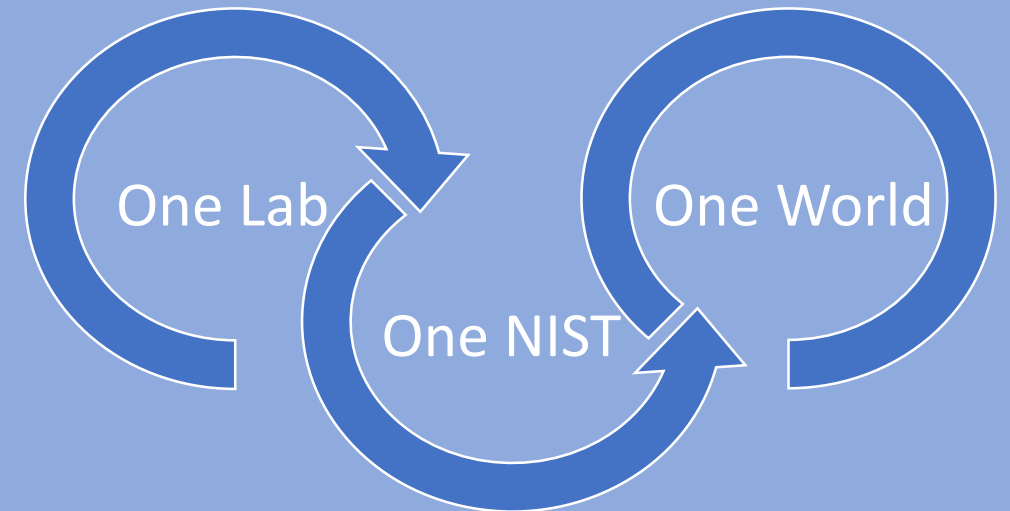
To Comprehensive Food Safety Program

New X-ray Beamlines at Brookhaven
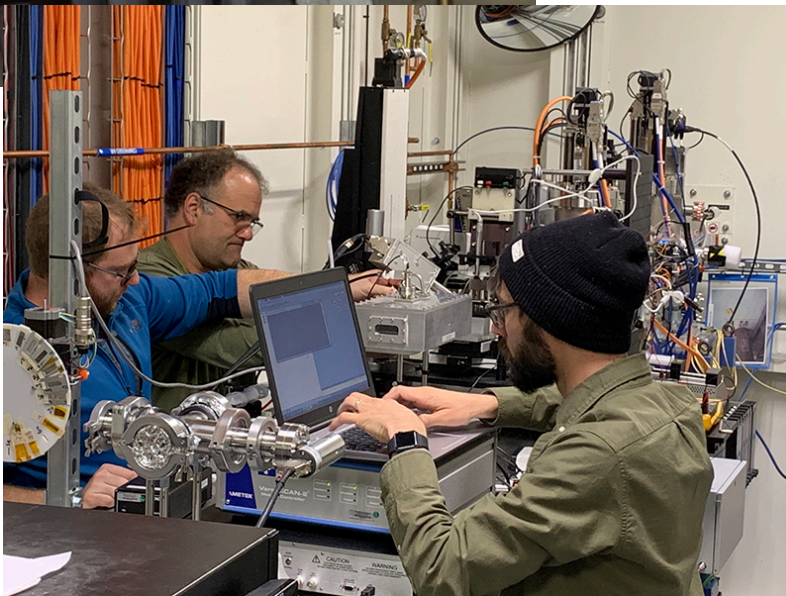
NIST celebrated the opening of three new X-ray beamlines at the National Synchrotron Light Source II (NSLS-II) (Brookhaven National Laboratory)

The beamline suite can be used to measure the electronic, chemical and structural properties of almost any material, often at the nanoscale

NIST already has industry-focused partnerships to apply the new beamline capabilities

Programs underway between NIST, BNL, and industrial partners in catalysis and AI-driven autonomous experimentation

Research Data Framework Workshop

NIST

MML's Office of Data and Informatics (ODI) co-led a Research Data study kickoff with CODATA

Brought together Government, universities, research libraries, academic publishers, private industry, standards bodies, and more

Community-wide assessment found a need to pursue a sustainable research data framework based on FAIR principles

NIST Fire Video in Forbes Top VR Videos of 2019

360-Degree Video in Fire Research

Photo credit: Matthew Hoehler

NIST
Fire Research Division

Videos on NIST website:
https://www.nist.gov/el/fire-research-division-73300/national-fire-research-laboratory-73306/360-degree-video-fire

A prescribed forest management fire in the New Jersey Conservation Foundation's Franklin Parker Preserve in the New Jersey Pine Barrens conducted on March 27, 2019 by the U.S. Forest Service and New Jersey Forest Fire Service.

This video shows a forest fire that spreads from treetop to treetop, called a crown fire.

The video was captured using a water-cooled glass enclosure developed at NIST to protect 360° cameras in fires.

NCNR Facility Enhancements

CANDoR In Commissioning

Number of Research Participants
2922

Reactor safety relay system replaced

47 reactor safety and control circuits
82 new reactor safety and control relays
3200 terminations
4000' (1.2 km) of new wire

Renewal of Community Resilience COE

Power network Water network Transportation

Credit: http://resilience.colostate.edu/

NIST awarded a renewal of a $20 million cooperative agreement to Colorado State University (CSU) to continue the work of the Community Resilience Center of Excellence.

The center has 12 university partners and is led by CSU and East Carolina University

The center will:
- ❑ Continue developing computer and field study tools and best practices to lessen the impact of natural hazards on communities and to improve community planning and recovery.
- ❑ Engage communities during development to aid the transfer of these tools to the end users.

Forensics COE Renewal

Awarded to a consortium led by Iowa State University in May 2015 to support NIST's efforts to advance the probabilistic methods to enhance forensic analysis

Request for Application (RFA) issued for Iowa State to propose renewal – awaiting application

Tech Transfer Through FedTech
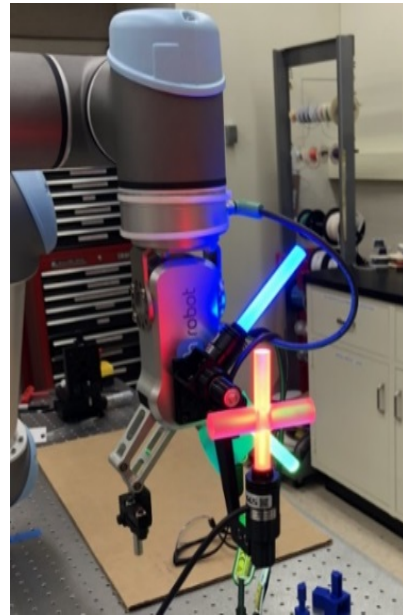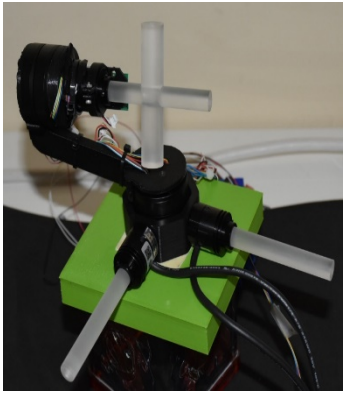
NIST

- FedTech grew out of the NSF I-Corps program to commercialize federally-funded R&D.

- NIST has partnered with FedTech to commercialize a patent-pending mechanism to track the position and orientation of objects in the environment for robotics applications.
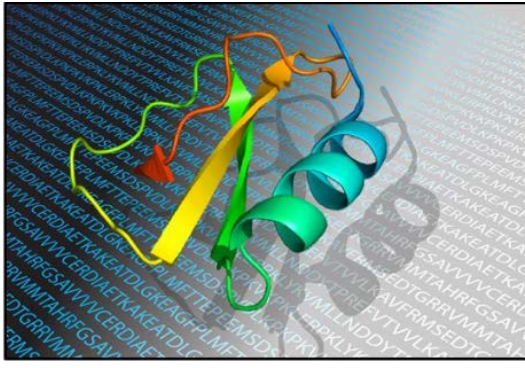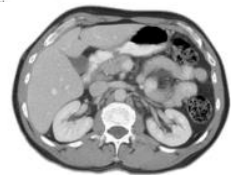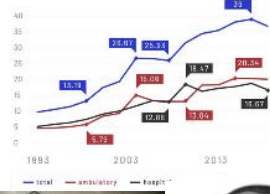
- Nuance. Inc. has obtained a research license for NIST's technology and has built their company around using it to solve industries' perception challenges.

Technology Maturation Accelerator Pilot

NIST

$!,000,000 to accelerate the maturation of emerging technologies with significant commercial promise

Focuses on currently existing laboratory technology or intellectual property where translational research is needed to prove feasibility and/or build a laboratory-scale working prototype.
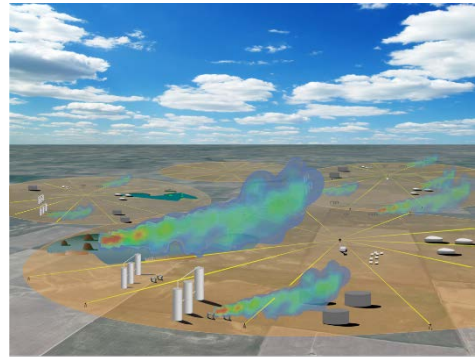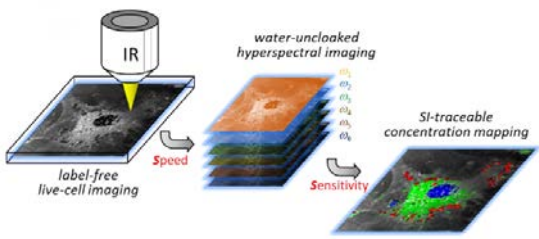
Merit review board narrowed the proposals down to ten, which the provided a six minute pitch to a team of venture capitalists

Assessment of NIST-on-a-Chip (NoaC) Pilot

A gap analysis and recommendations on the processes, resources, and structure needed at NIST to support a comprehensive technology transfer program that can be scaled beyond NOAC activities.

People

Knowledge

Resources

Technology Transfer

Main NoaC Study Recommendations

NIST

Inventor

Technology Liaison

Company

TPO
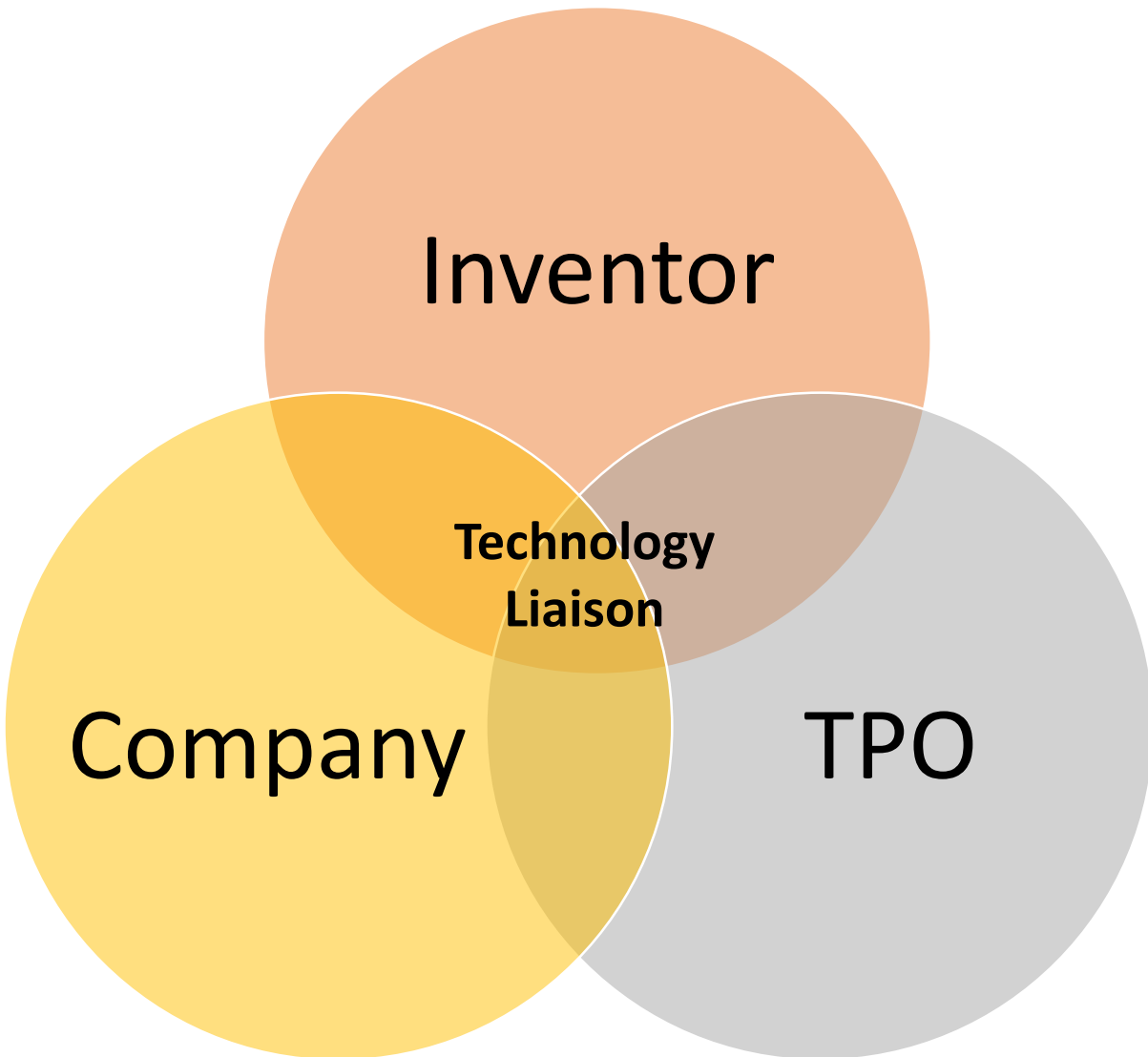
Establish role of a Technology Liaison

Culture change is required especially as related to expectations and processes

Leverage best practices to ensure NIST is world-class in tech transfer

Priority 1: Advance U.S. Technological Leadership in the Industries of the Future

NIST will continue to expand research efforts in these five areas and work to strengthen U.S. engagement in standardization efforts

Advanced Communications/5G

AI-enabled measurement systems to support wide deployment of 5G wireless technologies, Participating and leading in 5G standards development

Quantum Science

New quantum networking grand challenge will build on NIST world-leading science, while NIST expands industry partnerships in the Quantum Economic Development Consortium

Advanced Manufacturing

Providing technical support and key infrastructure to the nation's manufacturing industries as they strive to out-innovate global competitors

Artificial Intelligence

Leading efforts to prioritize and address key AI standards needs while developing training and testing tools for research domains from materials science to robotics

Engineering Biology

Living Systems Foundry for safe, predictable design and control of biological systems

Priority 2: Create the Infrastructure for a 21st Century Research Institution

NIST must make sure that it has the physical and IT infrastructure to carry out its programs and mission, including the Industries of the Future and beyond

Prioritizing awarding of construction and maintenance funding:

➢ Wing 5 in Boulder

➢ Radiation Physics Laboratory in Gaithersburg

➢ Utility infrastructure projects

➢ Predictive maintenance tools and software systems

65% of NIST facilities have not been renovated or newly constructed in last 20 years

Ribbon-cutting ceremony for NIST Radiation Physics Laboratory 9/23/19

Priority 3: Strengthen U.S. Economic Competitiveness

NIST will continue to advance and modernize technology transfer from federal laboratories

Major Activities

- Raise national awareness of tech transfer opportunities and successes with Manufacturing USA institutes and agency partners

- Launch a DOC/NIST competition for a new Manufacturing USA institute, target selection 12/20

- Rebuild iEdison reporting system for extramural inventions, RFI open now

- Continue to advance legislative updates to increase return on investment from federally-funded R&D

- Update metrics for Federal Technology Transfer Report to improve tracking and value capture

- Promote regional tech development and small business engagements

Goals for 2020: Realign and Optimize

NIST

Organizational realignment to better meet key objectives
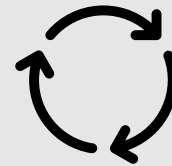
Advance NIST-wide strategic planning, implementation, and monitoring cycles

Process improvements: our goal is none other than to be the best in government

Unified messaging of bold initiatives and strategic external relationships

Recent Awards

Fellow of the Association
For Computing Machinery
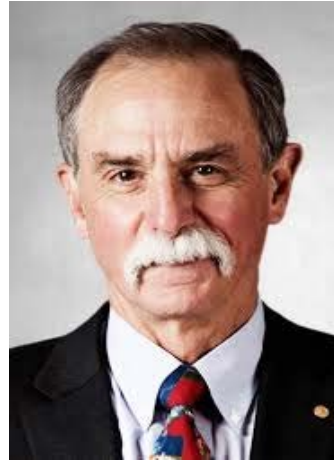
Innovation Research
Interchange (IRI) Medal

R&D 100 Award

Ron Brown Excellence in
Innovation Award
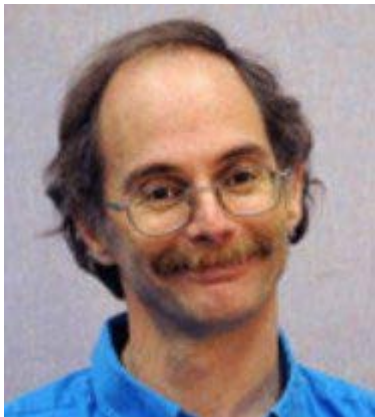
Optical Society Fellow

2019 Presidential Rank Awards

Maryland Academy of Sciences
Outstanding Young Scientist Award

2020 Fed 100 Award

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- Realign NIST to address U.S. 21st Century challenges in hypercompetitive global economy
- NIST will visibly fulfill the Agency's national responsibilities
  - U.S. global leadership for Metrology, Standards & Technology
  - Advance the Industries of the Future
  - Technology transfer policy modernization & implementation NIST, government-wide

- Associate Director for Laboratory Programs (ADLP) to elevate standards policy, NIST international leadership roles, advance interdisciplinary research & development, with enduring focus on innovation.
- Associate Director for Innovation & Industry Services focus on technology transfer, advanced manufacturing and NIST-wide synergy with U.S. industry
- Changes reflect NIST priorities to foster development of human capital, cultivate our talent pipeline for diversity and a culture of inclusivity, integrate ongoing strategic planning NIST-wide, and maximize synergies for organizational effectiveness

NIST Realignment

New:

- Senior Advisor Technology Innovation: NIST internal & national technology transfer
- Chief Human Capital Officer: Integrated support for NIST Federal Employees & Associates
- Strategy Planning and Policy: Incorporating Program Coordination Office

Realigned:

- Onboarding Office – To Human Capital, leveraging training, leadership development
- Technology Discovery Office – To Technology Partnerships for technology outreach, analysis

- International and Academic Affairs – To Lab Programs, advancing strategic relationships
- Human Subjects Protection Office – To Lab Programs, strengthening Research Services
- Associates Support - Integrated NIST-wide with Human Capital for strategic workforce management

NIST Organization* 2019

National Technical Information Service (NTIS)

NIST Director / Under Secretary of Commerce for Standards and Technology

Office of Chief Counsel

Chief of Staff

Associate Director for Laboratory Programs (ADLP)

Associate Director for Innovation and Industry Services (ADIIS)

Associate Director for Management Resources (ADMR)

Laboratory Programs

Communications Technology Laboratory

Engineering Laboratory

Information Technology Laboratory

Material Measurement Laboratory

NIST Center for Neutron Research

Physical Measurement Laboratory

  Center for Nanoscale Science & Technology

Special Programs Office

Standards Coordination

Innovation and Industry Services

Baldrige Performance Excellence Program

Hollings Manufacturing Extension Partnership

Office of Advanced Manufacturing

Technology Partnerships Office

Management Resources

Office of Human Resource Management

Civil Rights and Diversity Office

Safety, Health and Environment

Financial Resource Management

    Acquisition and Agreements Management

Information Systems Management

Facilities and Property Management

Information Services

    Technology Discovery Office

Emergency Services

Fabrication Technology

Congressional and Legislative Affairs

Public Affairs

Executive Officer for Administration

Management and Organization Office

Human Subjects Protection

International and Academic Affairs

Onboarding

Program Coordination Office Staff

*Principal functions shown

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NIST Organization* 2020

NIST

National Technical Information Service (NTIS)

NIST Director / Under Secretary of Commerce for Standards and Technology

Office of Chief Counsel

Policy & Strategic Planning Office

Chief of Staff

Associate Director for Laboratory Programs (ADLP)

Associate Director for Industry Partnerships (ADIP)**

Associate Director of Management Resources (ADMR)

Congressional and Legislative Affairs
Public Affairs
Executive Officer for Administration
Management and Organization Office

- **Laboratory Programs**

Communications Technology Laboratory
Engineering Laboratory
Information Technology Laboratory
Material Measurement Laboratory
NIST Center for Neutron Research
Physical Measurement Laboratory

Deputy Director for Laboratory Programs
Strategic Relationships
- **Research Protections**
    Human Subjects Protection
    Special Programs Office
Standards Coordination
International and Academic Affairs

Innovation and Industry Services
Baldrige Performance Excellence Program
Hollings Manufacturing Extension Partnership
Office of Advanced Manufacturing
Technology Partnerships Office
    Technology Discovery Office

Senior Advisor Technology Innovation

Management Resources
Human Capital
    Human Resource Management
        Onboarding
Civil Rights and Diversity Office
Safety, Health and Environment
Financial Resource Management
    Acquisition and Agreements Management
Information Systems Management
Facilities and Property Management

Information Services
Emergency Services
Fabrication Technology

*Principal functions chart.
Green font – Complete
Red font – In progress

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Congress of the United States
House of Representatives
COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

United States Senate
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

APS physics

High Level Dialogue on International Scientific Engagement

CSIS | CENTER FOR STRATEGIC & INTERNATIONAL STUDIES

Dialogues on Innovation, Competitiveness and Quantum Sciences

NSF 70th Panel – Partnerships for the Industries of the Future

BROOKINGS

US-EU Dialogue on AI Policy

Meeting Agenda

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