# NIST Update
## Visiting Committee on Advanced Technology

James K. Olthoff

Associate Director performing the Nonexclusive Duties of the NIST Director

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

# Boulder Fires and NIST Community Impact

*Image Credit: Colorado Governor Jared Polis*

The **Marshall Fire** on December 30, 2021, caused significant disruption to the NIST community in Boulder, CO.

- **29 federal employees** are known to have been directly impacted and an estimated **equal number of contractors and associates** were affected

- NIST is aware of **5 staff and 3 associates who have lost their homes**

- NIST put in place several resources to help affected staff

# Welcome New VCAT Member

**Dr. Michelle Parker**

Vice President and Deputy General Manager
Space and Launch
Defense, Space & Security
Boeing

# NIST Leadership Changes

NIST

## Dr. Laurie Locascio

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

**Status:** Nomination was resubmitted, and currently waiting for congressional action.

*Image Credit: UMD*

# NIST Leadership Changes
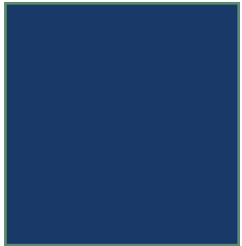
**Dr. Joannie Chin**

Director,
Engineering Laboratory

**Hannah Brown**

Deputy Associate Director of
Laboratory Programs

# NIST Leadership Changes

**Anita Vanek**

Deputy Associate Director for
Management Resources

# Meeting Agenda

**Session I: Programmatic Updates**

- **NIST Update and Agenda Review**

- **Safety Update**

**Session II: Programmatic and Operational Updates**

- **Forward Looking Plan for MEP**

- **NCNR Update**

- **Diversity, Equity, Inclusion, and Accessibility at NIST Update**

**Session III: Working Session**

- **Review of the 2021 VCAT report**

# America COMPETES Act of 2022

NIST

Contains deliverables and requests for NIST in a broad range of areas including:

- **Engineering biology, biomanufacturing, and bio metrology**

- **Green House Gas Measurement**

- **Cybersecurity for supply chain, Cloud Computing, and Usability**

- **Biometric Identification**

- **Artificial Intelligence and Data Science**

- **Other Transaction Authority (OTA) for NIST**



*Credit: Shutterstock/Lucky-photographer*

# CHIPS Act Status

**Industrial Advisory Committee (IAC)**

Department of Commerce and NIST solicited nominations to a newly established IAC.

**Request for Information (RFI)**

On January 24th, the Department of Commerce and NIST issued an RFI on the CHIPS Act.

**America COMPETES Act**

On January 25th, House version of USICA introduced as part of the America COMPETES Act of 2022.

Credit: Intel

NIST Program Update – continued progress on our priorities

# Artificial Intelligence Update

NIST



Image Credit: N. Hanacek/NIST

## AI Risk Management Framework

- To better manage risks to individuals, organizations, and society associated with AI

- 1st draft expected in March

- Workshop #2: March 29-31

## National AI Advisory Committee (NAIAC)

- To advise on AI topics including state of science and U.S. competitiveness, workforce

- Review and selection process underway

# Cybersecurity Update

**Updated Federal PIV Standard**

Federal Information Processing Standard (FIPS) 201 increases number of acceptable credentials types

**Executive Order 14028, Improving the Nation's Cybersecurity**

- Updated Secure Software Development Framework

- Labeling requirements for software and Internet of Things (IoT) devices to inform consumers about product security

*Image Credit: Pixabay*

# Quantum Information Sciences Update

Credit: D. Slichter/NIST

NIST physicists demonstrate high-fidelity laser-free universal control of two trapped-ion qubits by creating both symmetric and antisymmetric maximally entangled states. This could lead to new ways to make more powerful quantum computers based on ions (charged atoms).
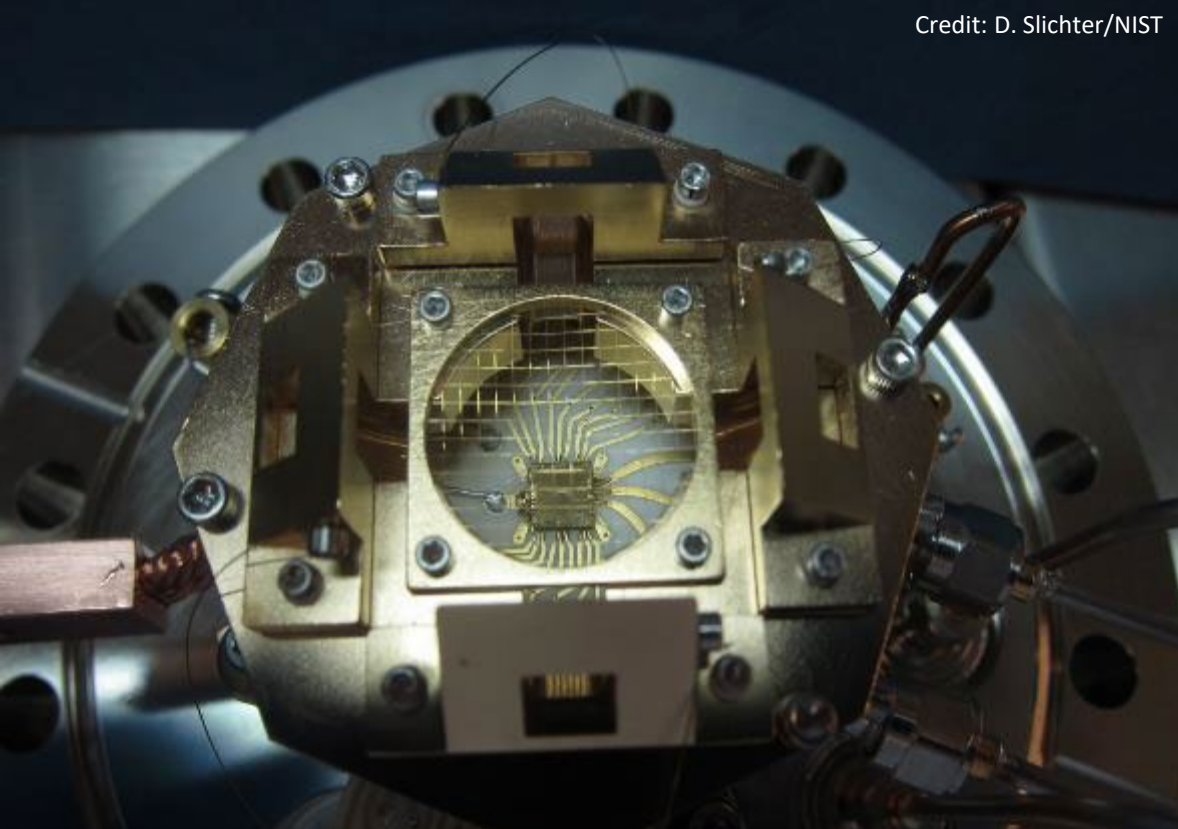
## Quantum Economic Development Consortium (QED-C)

QED-C study and report on "Quantum Computing Industry and Related Supply Chain" 14 JAN, 2022

QED-C report on "Electronic Control of Quantum Systems" 30 DEC, 2021

## Recent Workshop

Practical Intermediate Representation for Quantum (PIRQ) Workshop. 15 DEC, 2021

# Biotechnology Update

NIST



*Image Credit: NIST*



*Image Credit: NIST*

**NIST's Genome in a Bottle (GIAB) human genome reference standards were used to certify a new Guinness World Record for the fastest sequencing of a single human genome (5 hr, 2 min)**

**A recent study showed that NIST's SARS-CoV-2 Synthetic RNA Research Grade Test Material can help harmonize and increase the reliability of PCR assays that are used to track and monitor the circulation of SARS-CoV-2 around the world.**
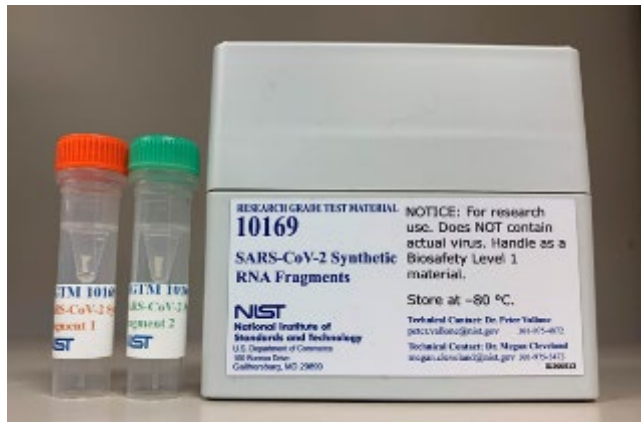
*Image Credit: CDC*

# Advanced Communications Update

## Public Safety Communications Research

New report shows **$509.8 M in economic impact** by Public Safety Communications Research (PSCR) Division



*Image Credit: NIST*

## IEEE Standard for Intercloud Interoperability and Federation

**Supports evolving business models and facilitates cloud computing** based on IEEE's P2302 Working Group and NIST research



*Image Credit: Shutterstock*

## NextG Wireless Gaps Analysis Update

- Partnering with NSF & DoD to identify technical **gaps for innovation of post-5G wireless**

- **Assesses research advancements** and **characterizes technology gaps**



*Image Credit: NIST*

# NIST and Autonomous Vehicles

**Standards and Performance Metrics for On-Road Autonomous Vehicles Workshop**

March 8 - 9, 2022

Safety | Communication | Cybersecurity | Artificial Intelligence | Sensor Perception

**Automated Driving System Safety Measurement Part I: Operating Envelope Specification**

NIST Special Publication 1900-301: a novel approach to automated driving systems safety measurement

*Image Credit: Shutterstock/Zapp2Photo*

# Standards Update: Situation

Increased PRC investment in R&D and SDO participation targeting critical and emerging (CET) technology creates a strategic challenge for the U.S.

Instead of "packing the room", the U.S. requires an agile and asymmetric approach built around:

1) A sustained investment in R&D – a critical component of successfully influencing international standards

2) Expanded collaborations between allied governments, industry, and academia

3) A commitment to industry-led standards development processes

NIST and DOC efforts will ensure that the U.S. and its allies have a sustainable foundation for continued leadership in SDO activity for CET



NIST has a pivotal role to play in coordinating U.S. government agencies' participation in standardization. The active involvement of NIST and U.S. government representatives in preparing for standards negotiations—as well as in standards committees and working groups—is welcomed by U.S. and international industry collaborators.

- Center for Strategic & International Studies

# Standards Update: International Engagement

Image credit: Official White House Photo by Adam Schultz

## Quadrilateral Security Dialogue (Quad)

- **First-ever Quad Leaders Summit held in SEP 2021**
- **Released a joint statement that included CET standards**
- **NIST chairs the CET WG Standards Subgroup**
- **NIST leading efforts to facilitate coordination on technology standards development**
- **Next Quad Ministerial (in-person) in Melbourne (FEB 2022)**



Image credit: State Department Photo by Ron Przysucha/ Public Domain

## U.S.-EU Trade and Technology Council

- **Inaugural meeting "Pittsburgh Summit" in SEP 2021**
- **NIST and ITA Co-Chair Technical Standards Subgroup**
- **Identified AI as CET area of interest (advanced manufacturing and other areas in development)**
- **Collaborating on a U.S.-EU International Standards Alert system**
- **Identifying opportunities to engage the private sector**
- **Next TTC Ministerial Meeting in Paris (May 2022)**

# Standards Update: Progress in the TTC

NIST

## U.S.-EU TTC Technology Standards Cooperation Working Group
## Near-Term Deliverables



Image credit: State Department Photo by Ron Przysucha/ Public Domain

**U.S.-EU Trade and Technology Council**

- Enhanced SDO Election Coordination

- U.S.-EU International Cooperation on Standards Network (ICSN)

- U.S.-EU International Technology Standards Early Warning System Coordination (ITSEWS)

- Technology Standards WG Artificial Intelligence Focus Group

# NIST Facilities Construction Program
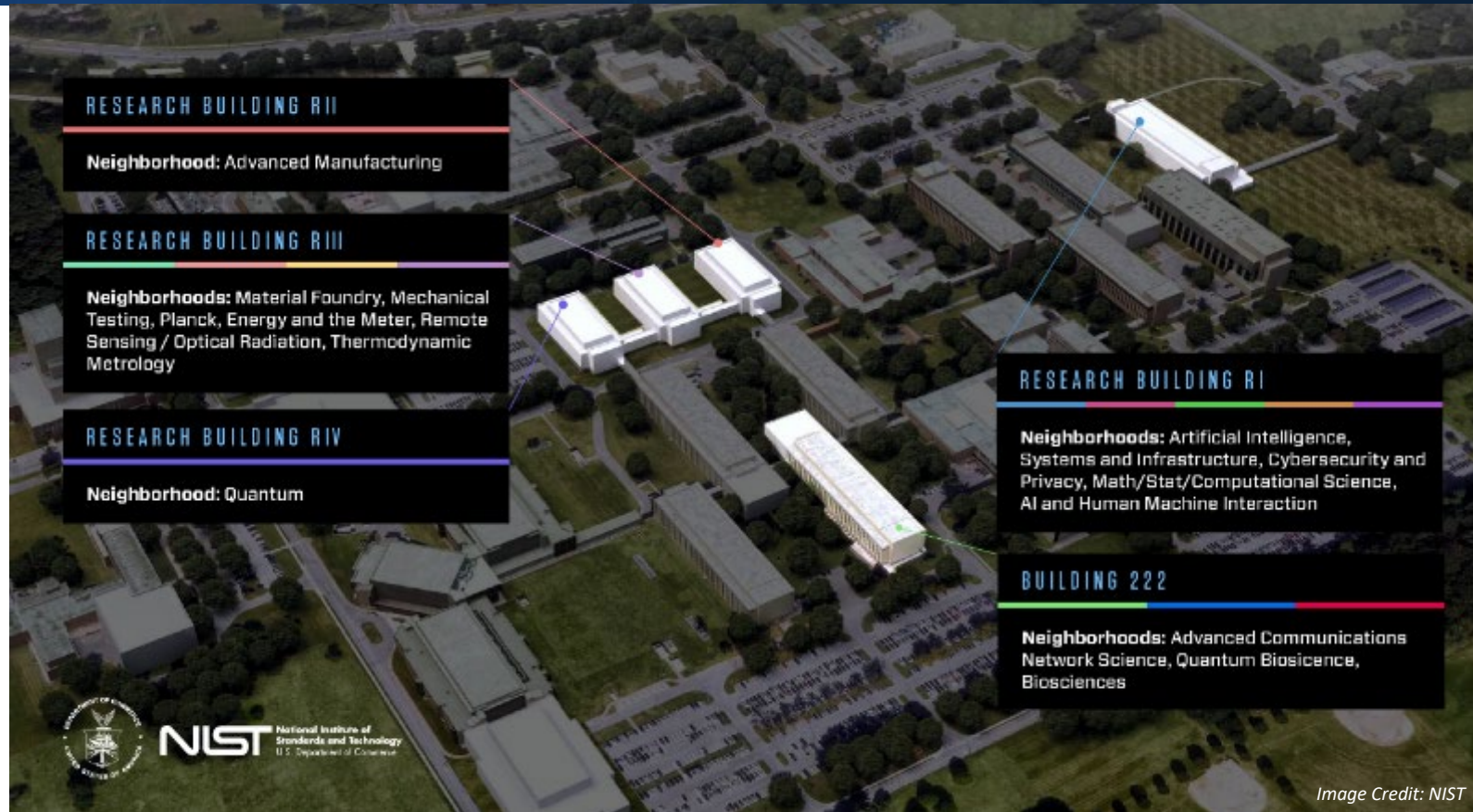
## NIST Facilities Master Plan

### Financial

- $4.2 billion program submitted by NIST

- $665 million in Build Back Better bill

- $2.3 billion will be sufficiently planned to start by September 2022

### Components

- Complete funding for B245 Modernization & B1 Renovation

- Program of Requirements in development for 12 additional facilities

### Time to Complete

- $2.3 billion program: 5 years for both campuses

- $4.2 billion program: Boulder = 5 years & Gaithersburg = 12 years



RESEARCH BUILDING RII

Neighborhood: Advanced Manufacturing

RESEARCH BUILDING RIII

Neighborhoods: Material Foundry, Mechanical Testing, Planck, Energy and the Meter, Remote Sensing / Optical Radiation, Thermodynamic Metrology

RESEARCH BUILDING RIV

Neighborhood: Quantum

RESEARCH BUILDING RI

Neighborhoods: Artificial Intelligence, Systems and Infrastructure, Cybersecurity and Privacy, Math/Stat/Computational Science, AI and Human Machine Interaction

BUILDING 222

Neighborhoods: Advanced Communications Network Science, Quantum Bioscience, Biosciences

*Image Credit: NIST*

# NIST Facilities Update

## Building 245 Modernization

**Completed**: H-Wing Addition, Infrastructure, Early labs
**Awarded**: Swing space, Wing C, Wings A & D (partial)
**Awaiting funding**: Wing B, Wings A & D ($70 M); Wing G ($7 M)

## Building 1 Renovation

**Completed**: Wings 3 & 6, Building 3, Boulder Computing Facility
**Awarded**: Wing 5, Wing 4
**Awaiting funding**: Building 3 Addition ($30 M), Partial Spine ($23 M)

## NASEM Review

- National Academies of Sciences, Engineering & Medicine (NASEM) to **review NIST's facilities management program** and **provide recommendations on facilities budgetary needs**

- **18 members** from academia, the public, and federal agencies

- **Report due to Congress in September 2022**



Building 245 Modernization

Image Credit: Hensel-Phelps



Building 1 Renovation

Image Credit: NIST

# Study To Advance a More Productive Tech Economy

NIST

Image Credit: PopTika/Shutterstock

Studies on **emerging technology areas** to recommend policy and legislative proposals

- **Request for Information closing February 15**

- **In review**: Artificial intelligence

- **Ongoing**: 3D printing, New & Advanced Materials, Unmanned Delivery Services, and Quantum Computing

- **Up next:** Blockchain and IoT

**Final report due to Congress in December 2022**

Artificial Intelligence    Blockchain Technology

Internet of Things (IoT)    IoT in Manufacturing

New & Advanced Materials    Quantum Computing

3D Printing    Unmanned Delivery Service

# Office of Advanced Manufacturing | Manufacturing USA

**NIST**

## Pandemic Response Update

**CARES Act:** 11 NIIMBL Projects Completed

**American Rescue Plan (ARP):** $54 M will be awarded to non-Commerce funded institutes

## Manufacturing Technology Roadmapping Awards

- $3.2M available for awards with FY21 funds
- Additional awards will be considered pending FY22 budget or other legislation

| Agile Manufacturing Testbeds | Innovating Vaccine Production, Quality Testing and Stability |
|---|---|
| **NIIMBL** ARP Projects | |
| Rapid Scaling of Critical Reagents for Monitoring Emerging Variants | Strengthening the Biopharmaceutical Manufacturing Workforce |

**$83 M awarded to NIIMBL for coronavirus response**

Full portfolio of 32 projects announced DEC 2020

# DISCUSSION