NIST Update
Visiting Committee on Advanced Technology

James K. Olthoff

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

Virtual Meeting
June 8, 2021

Meeting Agenda

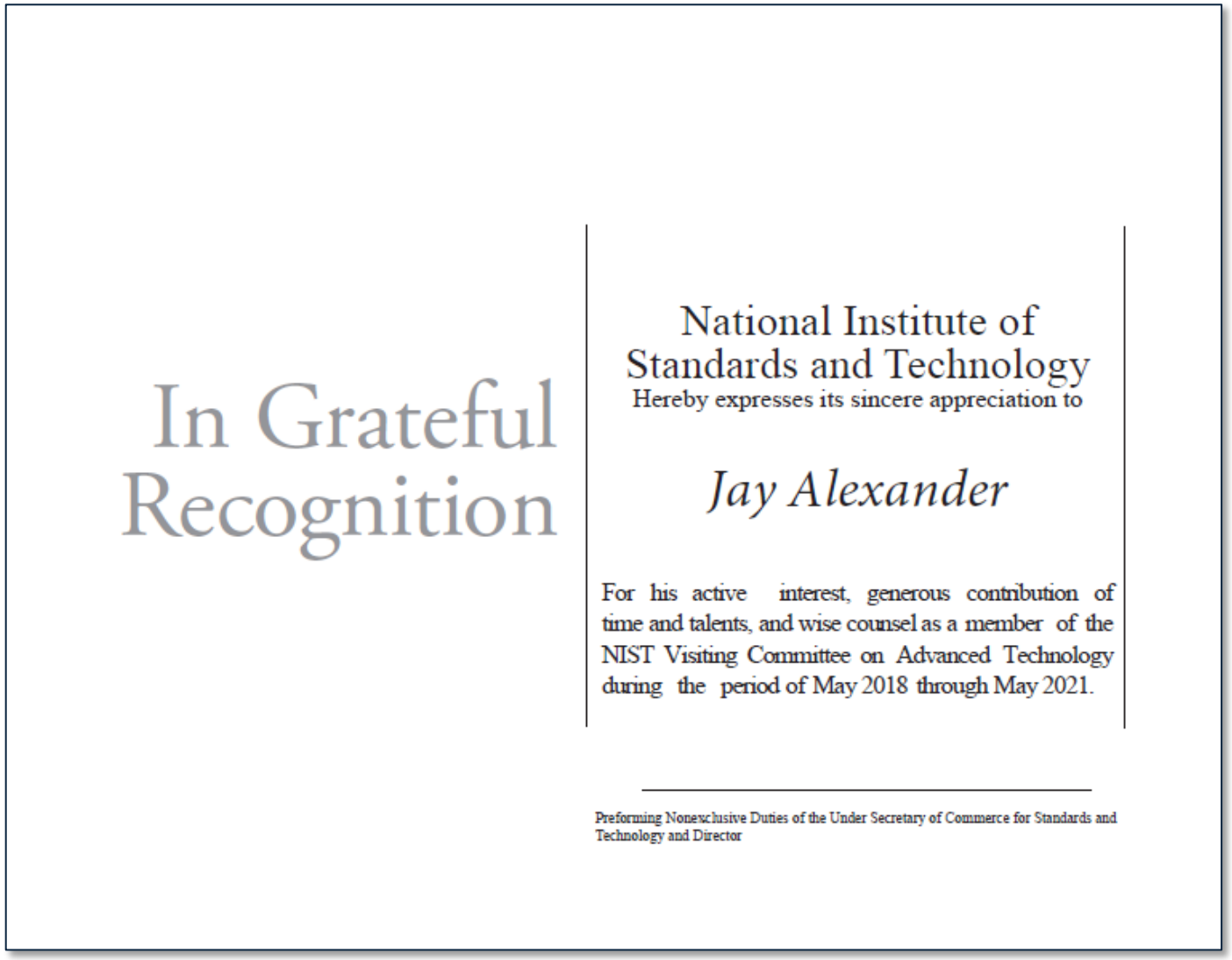
Session I:	**NIST Update – Programmatic Updates, Safety, and Telework/Remote Work Policy**
Session II:	Assessment of NIST's Laboratories by the National Academies of Sciences, Engineering, and Medicine (NASEM)
Session III:	The Evolving Priority Landscape for NIST – New Opportunities and Responsibilities
Session IV:	NIST Efforts in Diversity, Equity, and Inclusion (DEI)
Session V:	NIST Strategic Plan Update

VCAT Member Changes

Jay Alexander

Term ended May 21, 2021

Image Credit: Keysight



In Grateful Recognition

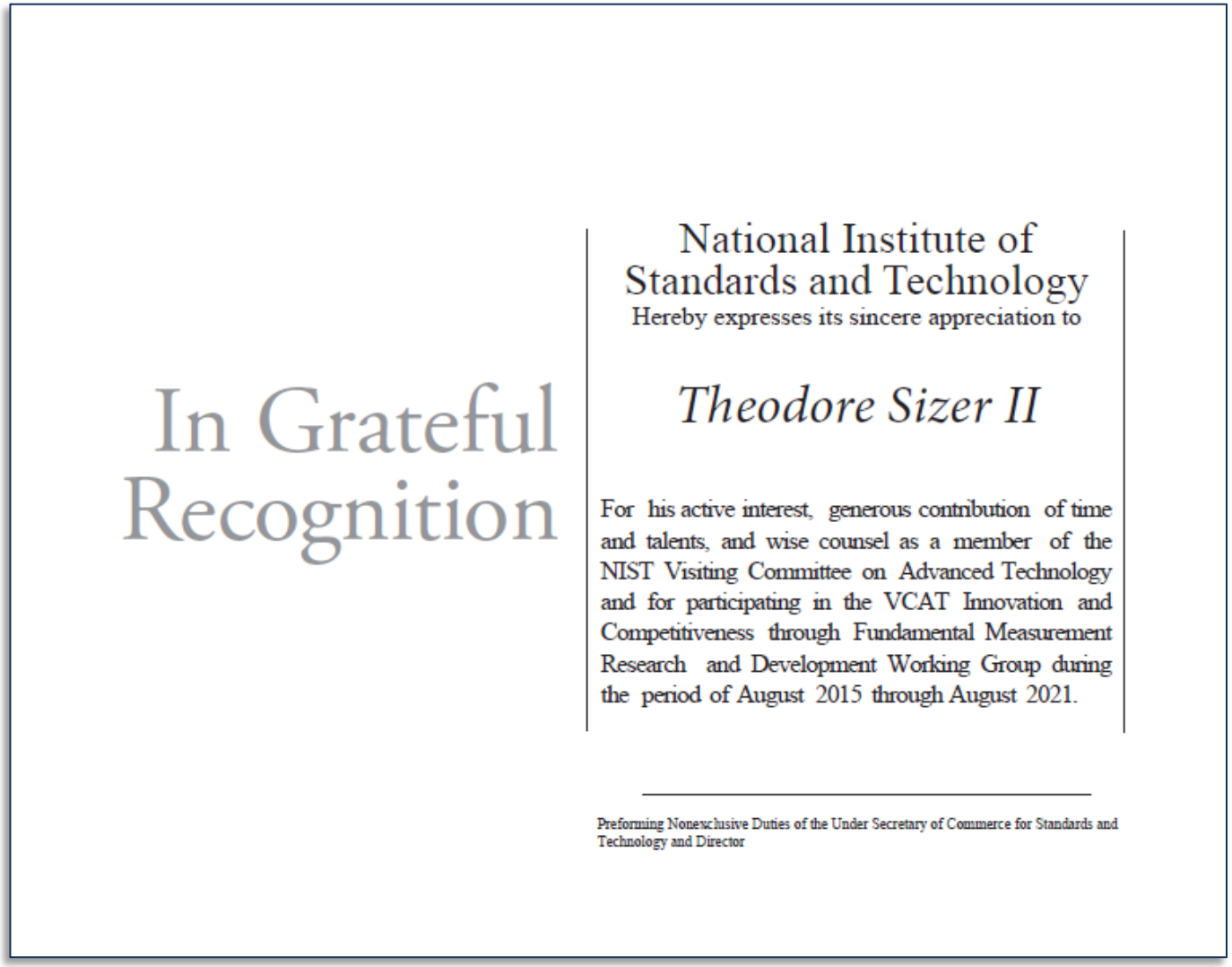
National Institute of Standards and Technology
Hereby expresses its sincere appreciation to

Jay Alexander

For his active interest, generous contribution of time and talents, and wise counsel as a member of the NIST Visiting Committee on Advanced Technology during the period of May 2018 through May 2021.

Performing Nonexclusive Duties of the Under Secretary of Commerce for Standards and Technology and Director

VCAT Member Changes



In Grateful Recognition

National Institute of Standards and Technology
Hereby expresses its sincere appreciation to

Theodore Sizer II

For his active interest, generous contribution of time and talents, and wise counsel as a member of the NIST Visiting Committee on Advanced Technology and for participating in the VCAT Innovation and Competitiveness through Fundamental Measurement Research and Development Working Group during the period of August 2015 through August 2021.

Performing Nonexclusive Duties of the Under Secretary of Commerce for Standards and Technology and Director

Theodore (Tod) Sizer

Term ends August 27, 2021

Image Credit: NIST

Session I: NIST Update

- NIST Programmatic Update

  Discussion
- Safety – Keeping NIST Staff Safe During COVID

  Discussion
- NCNR Situation Update

  Discussion
- NIST Plans for Telework Post-Pandemic

  Discussion

Session II: Assessment of NIST's Labs . . .

- Report out from NASEM Assessment of the Materials Measurement Laboratory and the Engineering Laboratory

  Discussion

- From MML assessment

  "NIST research is exceptional"

- From EL assessment

  "EL Programs have contributed major advancements in measurement science, standards, and technology over the past decade"

Session III: Evolving Priority Landscape . . .

- Budget Overview

  Discussion
- Future Plans for Manufacturing Extension Partnership (MEP) and Manufacturing USA

  Discussion
- NIST and Emerging Technology Standards Development

  Discussion

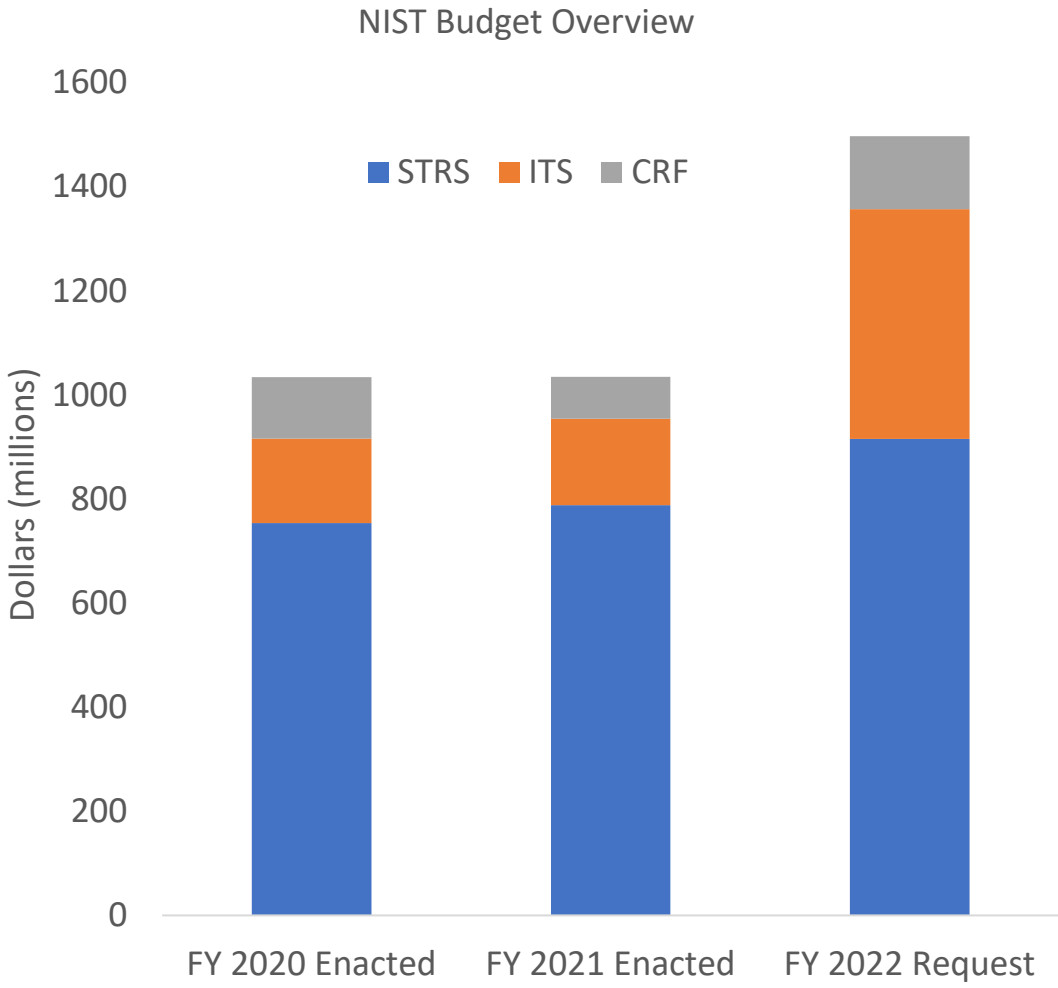
NIST Budget: FY 2022 Summary

$462.8 M (44.7%) increase over FY 2021 enacted levels:

- Fully fund inflationary adjustments to current programs
- Grow funding for nationally critical mission areas
- Expand NIST's manufacturing programs

Positions NIST to address critical national priorities:

- Advanced Communications/5G
- Advanced Manufacturing & Semiconductors
- Artificial Intelligence
- Biotechnology
- Climate, Environment, & Energy
- Cybersecurity and Privacy
- Internet of Things
- Quantum Science
- Racial Equity
- Standards Leadership



CARES Act funding in FY 2020 and
ARP Act funding in FY 2021 not shown

New Executive Orders

Executive Order 14028 (May 12)
Improving the Nation's Cybersecurity

Charges agencies with enhancing the security of the software supply chain

- Consult with stakeholders to identify or develop standards, tools, best practices, and guidelines to enhance software supply chain security
- Hold a software-related standards and guidelines workshop in June 2021
- Recommend minimum standards for vendors' testing of their software source code and publish guidelines by July 2021
- Initiate two pilot labeling programs related to secure software development practices and IoT to inform consumers about the security of their products

Executive Order 14017 (Feb 24)
America's Supply Chains

Charges agencies with reviewing global supply chains that support key U.S. industries to improve supply chain security

- Identify risks in semiconductor manufacturing and advanced packaging supply chains
- Report on supply chains for critical sectors and subsectors of ICT industrial base
- Partner with federal agencies and private stakeholders to ID and map critical supply chains

Executive Order 14005 (Jan 25)
Ensuring the Future Is Made in All of America by All of America's Workers

Charges agencies with partnering with Hollings Manufacturing Extension Partnership (MEP) for supplier scouting

- Identify U.S. companies that can produce goods, products, and materials in the United States that meet Federal procurement needs

Session IV: NIST Efforts in DEI

- Fireside Chat with NIST's New Director of DEI

  Discussion

- Findings and Recommendations from Data-Driven Studies: COACh Study of STEM Promotion

  Discussion

- Findings and Recommendations from Data-Driven Studies: ADLP Rotational Assignments

  Discussion

Session V: NIST Strategic Plan Update

- Update on New Initiatives

  Discussion

Program Highlights – continued progress on our priorities

Artificial Intelligence Updates

ADVISORY & WORKING GROUPS

- AI Federal Advisory Committee
  - Currently being established
- AI Standards Coordination Working Group (AISCWG) under Interagency Committee for Standards Policy (ICSP)

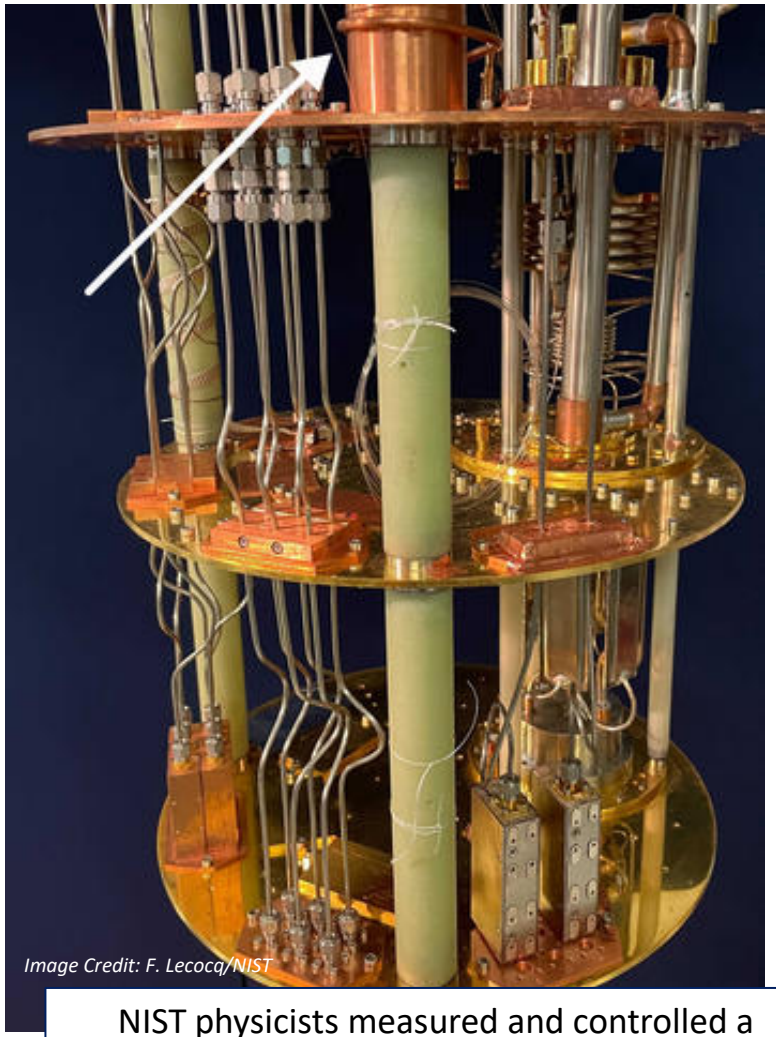
WORKSHOPS

- Assessing and Improving AI Trustworthiness | NASEM
  - March 03 – 04
- Secure Government Data Sharing | NSF/NIST
  - May 21 & 26
- AI in Drug Development | FDA/NIST/DARPA
  - June 31 – July 01

REPORTS

- Artificial Intelligence and User Trust
  - NISTIR 8332
- Machine Learning for Access Control Policy Verification
  - Draft NISTIR 8360

Quantum Information Sciences Updates



NIST physicists measured and controlled a superconducting quantum bit (qubit) using light-conducting fiber (indicated by white arrow).

Upcoming Workshops

Post-quantum Cryptography: Third PQC Standardization Conference
June 7-9

19th International Workshop on Low Temperature Detectors
July 19-26

Recent Publications

Using optical fibers in supercomputing quantum computers
Nature
March 25

Entangling two mechanical drums and measuring their quantum properties
Science
May 7

Quantum Hall edge states images and underlying structure
Nature Communications
May 14

Quantum Economic Development Consortium (QED-C)

Celia Merzbacher appointed executive director of the QED-C
March 15

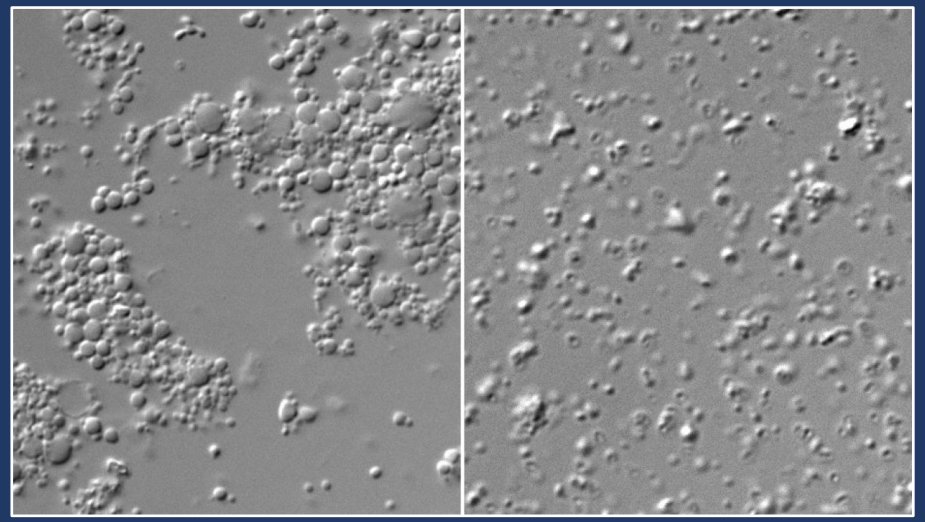
Winners of the R&D competition on cryogenic technology have not been announced yet

Engineering Biology: Research Highlight

Elizabeth Strychalski (MML)

In collaboration with MIT, UWO, UCSD, JCVI

- The team coaxed cells with the world's smallest genomes to reproduce normally
- Discovery could sharpen our understanding of which functions are crucial for normal cells and what the many mysterious genes in these organisms are doing
- Underpins synthetic biology efforts involving the utilization of cells or cell-like objects to produce chemicals, sense environmental conditions, deliver drugs, etc.



Cells growing inappropriately

Cells growing appropriately following addition of genes

J. F. PELLETIER *ET AL.*, *CELL* (2021) 184, 1-11

Manufacturing USA Update

Special COVID-19 report
https://nvlpubs.nist.gov/nistpubs/ams/NIST.AMS.600-7.pdf

Manufacturing USA Rapid Response to COVID-19

- Special report published in March 2021
- Presented at American Society of Mechanical Engineers (ASME) congressional briefing

American Rescue Plan – $150 million to NIST for additional high-impact pandemic response projects

- $90 million to NIIMBL for technology innovation supporting response to COVID-19
- $60 million to Rapid Assistance (for) Coronavirus Economic Response (RACER) Grant Program for R&D to prevent and respond to coronavirus

NIIMBL® The National Institute for Innovation in Manufacturing Biopharmaceuticals

- NIIMBL is in the final year of a five-year cooperative agreement with NIST
- Successfully evaluated by an independent review panel with new NIST performance protocol
- Recommended for renewal

- NIST is planning additional institutes for FY22

Climate Update

New NIST Framework Strives for Cleaner, More Secure Power Grid

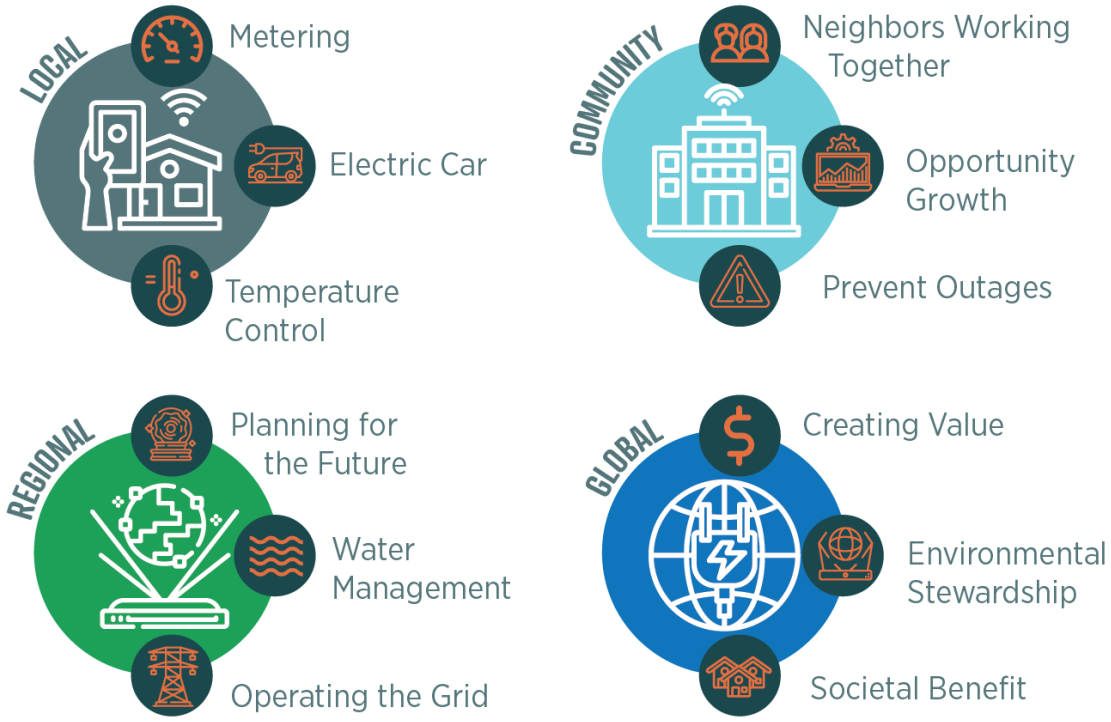


Image Credit: NIST

New in FY 2021 efforts in Direct Air Capture (DAC) and Carbon Capture Utilization and Storage (CCUS)

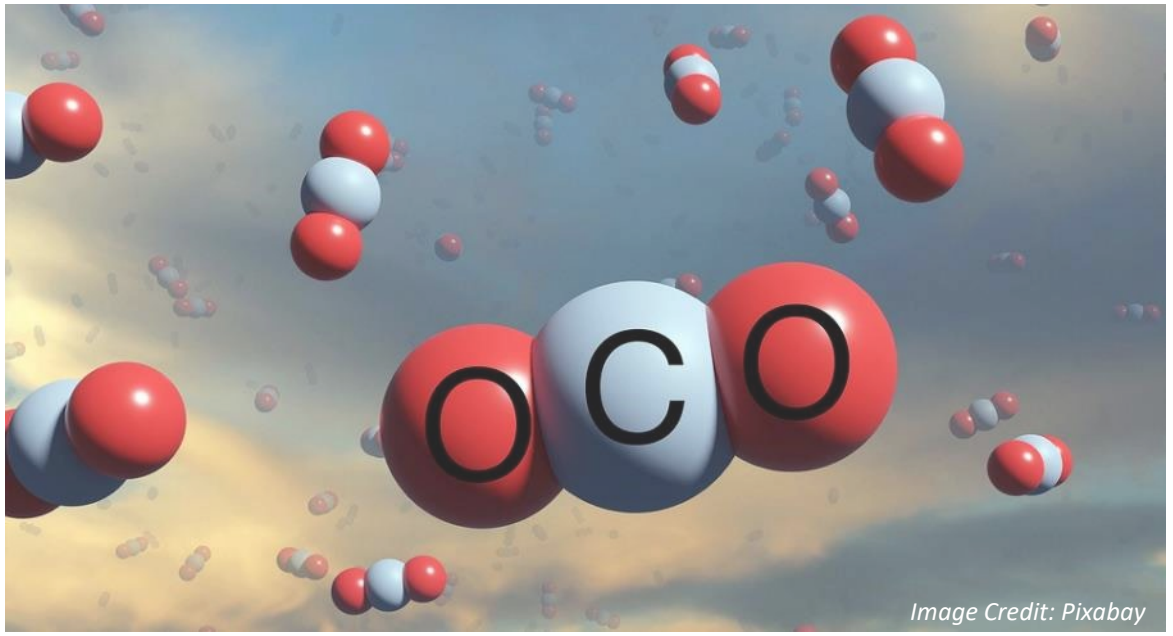


Image Credit: Pixabay

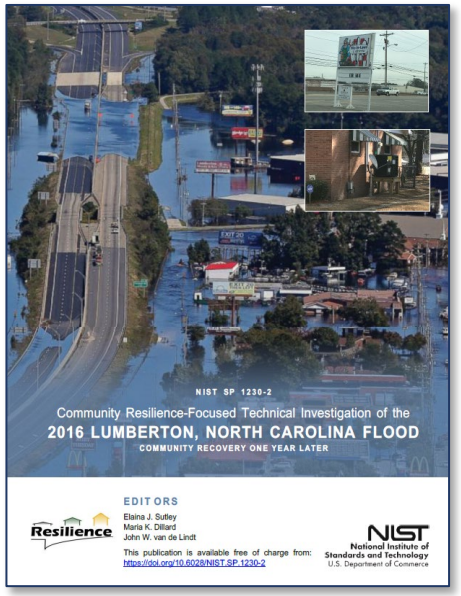
NIST is developing a comprehensive program to address current and future industry needs.

Key OUs: MML and NCNR

Community Resilience

Lumberton Wave 2

- Field study published April 2021
- Focus on social vulnerability, equity and recovery



Center for Risk-Based Community Resilience Planning
A NIST-funded Center of Excellence
Webpage: resilience.colostate.edu Email: resilience@colostate.edu

IN-CORE User Workshop

- Community scale modeling and hazard scenarios
- Social and economic Impacts

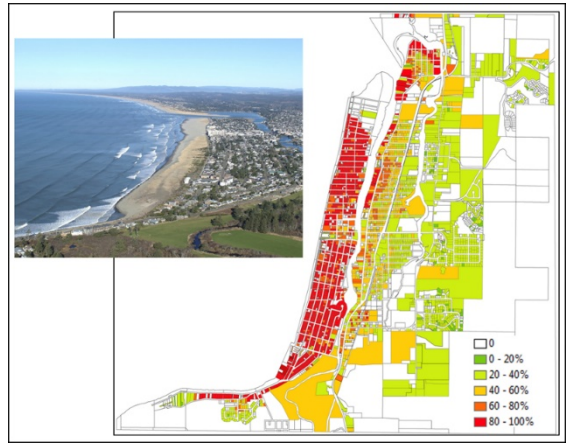
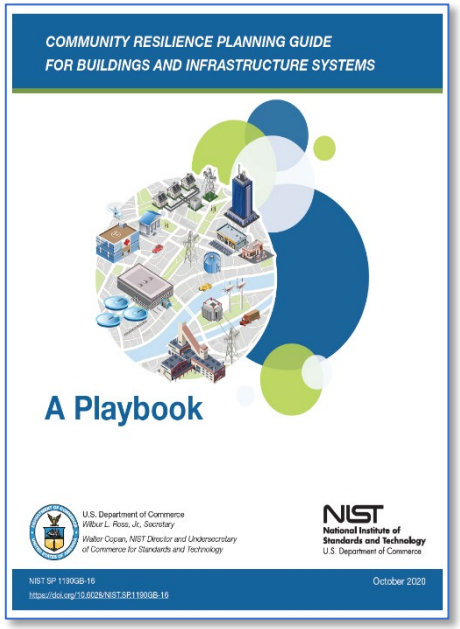


Image Credit: Community Resilience CoE



Community Resilience Planning Playbook

- HUD collaboration for community engagement
- Used for IN-CORE User Interface

Joplin Recommendations for Tornadoes

- New national tornado design requirements
- Targets high occupancy and critical buildings

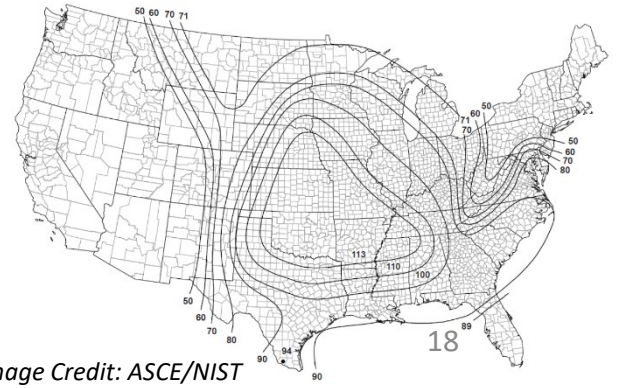


Image Credit: ASCE/NIST

Hollings Manufacturing Extension Partnership Update

THE WHITE HOUSE

Executive Order on Ensuring the Future Is Made in All of America by All of America's Workers

"…Sec. 7. Supplier Scouting. To the extent appropriate and consistent with applicable law, agencies shall partner with the Hollings Manufacturing Extension Partnership (MEP), discussed in the Manufacturing Extension Partnership Improvement Act (title V of Public Law 114-329), to conduct supplier scouting in order to identify American companies, including small- and medium-sized companies, that are able to produce goods, products, and materials in the United States that meet Federal procurement needs…"

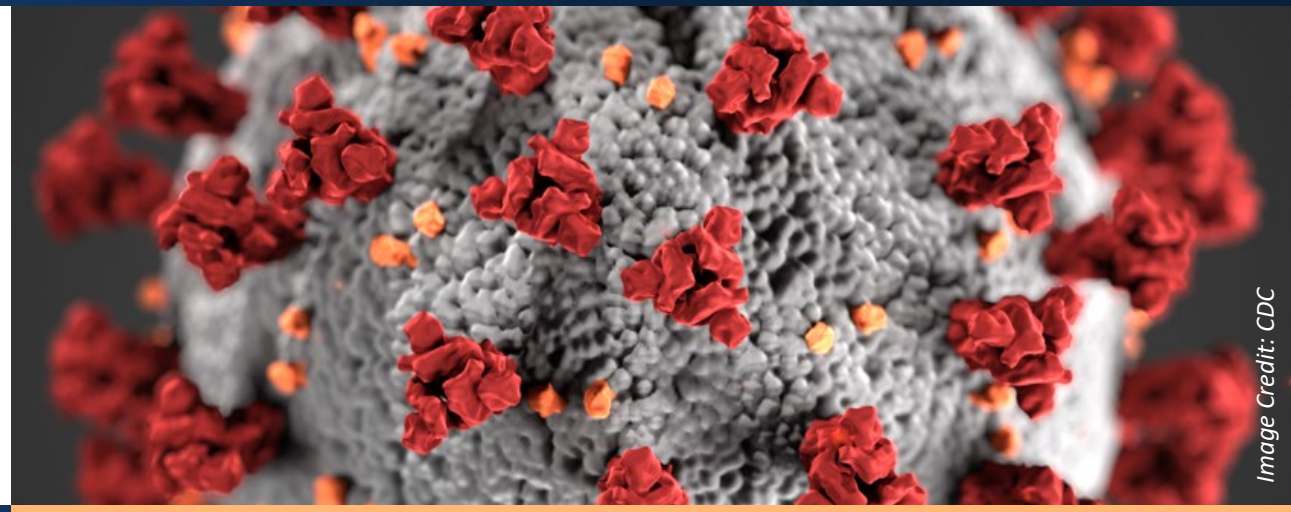


Image Credit: CDC

Increased MEP Supplier Scouting Activity

- New NIST MEP working group was formed in February
- Significant national- and state-level activity related to pandemic and general supply chain needs
- Correlation with *Made in America Executive Order 14005* increasing national interest and participation

Pandemic Response

- Worked directly with state and local government
- Connected resources to needs
- Addressed issues with manufacturing PPE, medical supplies, and medical devices
- Maintained base operations and served all manufacturers

DISCUSSION