

NIST-ASM FAIR Data for Additive Manufacturing

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Under Secretary of Commerce for Standards and Technology,
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October 27, 2020

Mission – *America's Innovation Agency*



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.



World-Leading Scientific and
Engineering Research



Advanced Manufacturing
National Programs



Technology Transfer and
Innovation

NIST AT A GLANCE

Industry's National Lab



3,400+
FEDERAL
EMPLOYEES



5
NOBEL PRIZES



2 CAMPUSES
GAITHERSBURG, MD [HQ]
BOULDER, CO



3,600+
ASSOCIATES



12
COLLABORATIVE
INSTITUTES



Thousands
of BUSINESSES USING
NIST FACILITIES



NATIONAL OFFICE
COORDINATING 16
MANUFACTURING
INSTITUTES



51
MANUFACTURING
EXTENSION
PARTNERSHIP CENTERS



U.S. BALDRIGE
PERFORMANCE
EXCELLENCE PROGRAM

Delivering our Mission: Products and Services **NIST**



Million-Pound Deadweight Machine

Credit: NIST

1,200 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

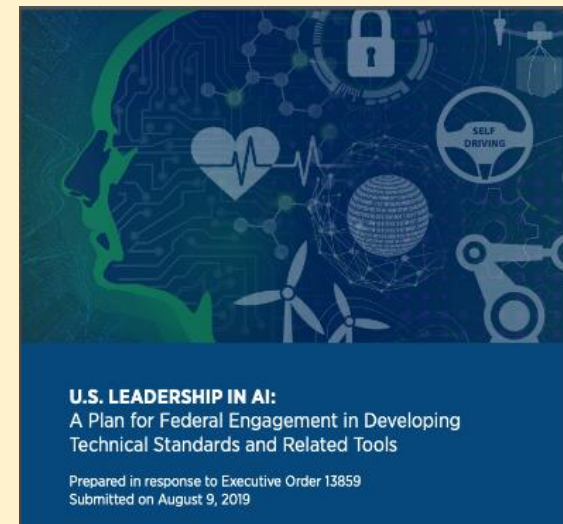
800 accreditations of testing and calibrations laboratories

Standards Leadership for the Nation



- Standards are critical to commerce and global trade.
- NIST research underpins standards development.
- NIST has unique responsibilities to coordinate federal participation in standards.

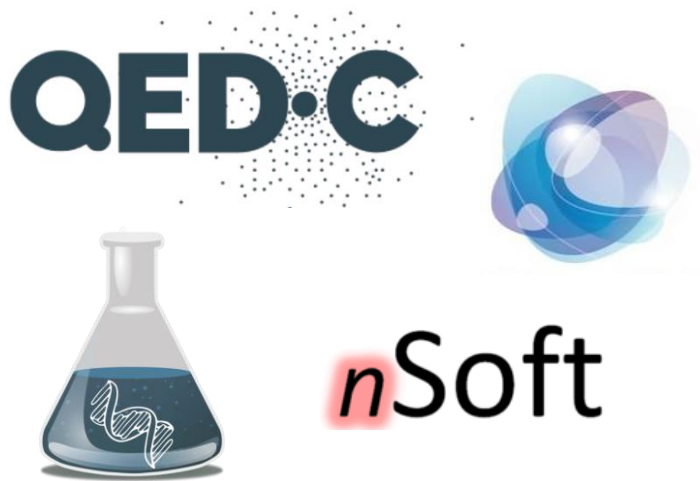
440 NIST technical staff lead and participate in more than **100** unique standards development organizations, contributing their expertise in over **1,500** standards activities



Partnerships Deliver

- NIST - Extensive collaboration networks
- NIST employs many partnership mechanisms

Consortia



Institutes and Centers



Grants Programs



NIST works with the nation's manufacturers to invent, innovate, and create by:

- **Precision measurements** - manufacturers use NIST test methods, tools, and scientific data every day
- **Advanced materials** - NIST is building a materials infrastructure to accelerate the design and deployment of new materials
- **Partnerships** - collaborations with industry and academia help advance research and support US manufacturers



Hollings Manufacturing Extension Partnership centers in every US state provide services to small and medium manufacturers

Manufacturing USA is nationwide network of public-private institutes to meet technical needs and create tomorrow's workforce



NIST labs develop measurements and tools for advanced manufacturing

Advanced Manufacturing in NIST Labs



Advanced Materials



Smart Manufacturing



Advanced Sensing/
NIST on a Chip



Nanomanufacturing



Biomanufacturing

- Developing measurement science to support US manufacturing
- Collaborating in advanced manufacturing
- Leveraging & supporting Manufacturing USA and Manufacturing Extension Partnership
- Additive Manufacturing an essential element of NIST's Smart Manufacturing thrust

Additive Manufacturing Across NIST

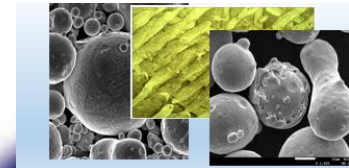
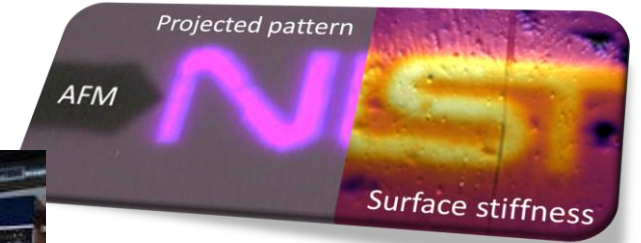


Additive manufacturing: A NIST Focus

NIST labs a microcosm of distributed AM community, including:

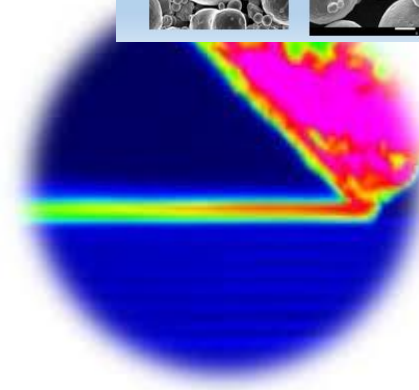
- Variety of equipment
- Distributed locations
- Multi-disciplinary expertise
- Significant data-driven research

Data a key unifier:
FAIR data principles focus



AMMD

NIST ADDITIVE MANUFACTURING
MATERIAL DATABASE



Aligning NIST Activities with FAIR Data



- FAIR data principles used throughout NIST to guide how we manage data
- FAIR principles help assure maximum return on research investments:
 - Promoting integrity of data management
 - Facilitating re-use of data by other investigators
 - Exposing research data outputs to the wider community

Research Data Framework Workshop



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 has been a longstanding advocate of FAIR data, including focused projects and workshops supporting FAIR adoption.

Executing the NIST Mission with Core Values



NIST Core Values



Perseverance: We take the long view, planning the future with scientific knowledge and imagination to ensure continued impact and relevance for our stakeholders.

Integrity: We are ethical, honest, independent, and provide an objective perspective.

Inclusivity: We work collaboratively to harness the diversity of people and ideas, both inside and outside of NIST, to attain the best solutions to multidisciplinary challenges.

Excellence: We apply rigor and critical thinking to achieve world-class results and continuous improvement in everything we do.

NIST's reputation of uncompromising technical excellence is made possible by rigorous, unbiased approaches to science.

The execution of NIST mission requires transparency, traceability, reliability, and reproducibility.

NIST's own data infrastructure and support includes:

- Public data repository and science data portal (data.nist.gov)
- Standard Reference Data
- Independent data repositories (e.g. AMMD.nist.gov)
- Laboratory Information Management Systems
- Enterprise Data Inventory
- Data management plans

Summary

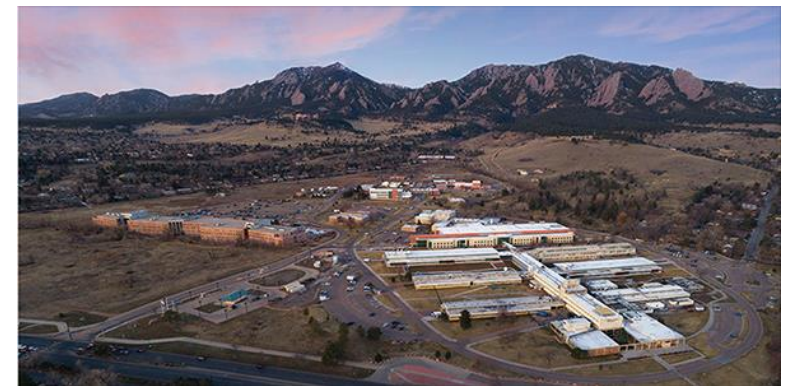


NIST serves industry through a **multifaceted approach** including **measurement science, technology development, and standards**

As a **world-renown research institute** NIST strives to **lead by example** and set new standards in **research excellence**

Advanced Manufacturing, including **additive manufacturing**, remains a **strategic priority** of NIST in support of US commerce

The principles behind ***FAIR Data*** underscore the values that define NIST



Thank you!

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