



Strengthening
University-Industry
Partnerships



R&D Collaborations with the National Institute of Standards and Technology (NIST)


October 21, 2020 10-10:45 AM EDT



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NIST's Capabilities, Your Needs UIDP October 21, 2020

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.



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World-Leading Scientific and Engineering Research



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Advanced Manufacturing National Programs



© Shutterstock/SergeyKohl

Technology Transfer and U.S. Innovation

NIST AT A GLANCE

Industry's National Laboratory



3,400+
FEDERAL
EMPLOYEES



5
NOBEL PRIZES



2 CAMPUSES
GAITHERSBURG, MD [HQ]
BOULDER, CO



3,900+
ASSOCIATES



11
COLLABORATIVE
NIST INSTITUTES



thousands
of BUSINESSES USING
NIST FACILITIES



14
COORDINATING
NETWORK OF MFG
INSTITUTES

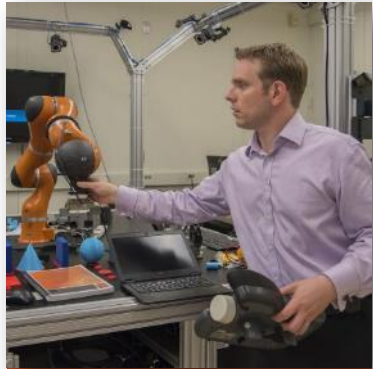


51
MANUFACTURING
EXTENSION
PARTNERSHIP CENTERS



U.S. BALDRIGE
PERFORMANCE
EXCELLENCE PROGRAM

NIST Addresses National Priorities



© F. Webber/NIST

Advanced
Manufacturing



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Cybersecurity &
Privacy



© FEMA

Disaster
Resilience



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Engineering
Biology



Credit: Chesky/fotolia.com

Internet of
Things



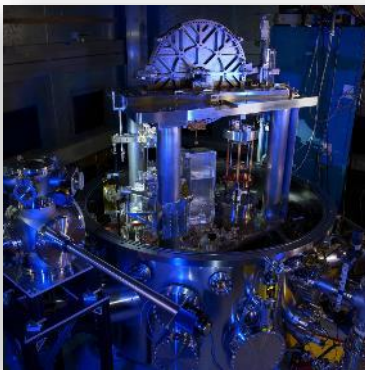
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Documentary
Standards



Shutterstock/anueling

Technology
Transfer



J. Lee/NIST

Measurement
Dissemination



E. Edwards/JQI

Quantum
Science



N. Hanacek/NIST

Artificial
Intelligence

NIST Extramural Programs



Public-private
partnerships
strengthening
America's
manufacturing core
and organizational
performance



Hollings
Manufacturing
Extension
Partnership



Manufacturing
USA®



Baldridge
Performance
Excellence
Program

In IIS we build communities around

- Technological innovations
- Manufacturing
- Performance excellence

We do this through the formation of public private partnerships

- Public-Private Partnership
- Mission: **defining, recognizing, and fostering quality and performance excellence** in U.S. businesses to enhance national competitiveness.
- Most widely known for the **Malcolm Baldrige National Quality Award** (recognizing excellence), since its inception the program has been very successful in improving the quality, performance, and long-term success and sustainability of businesses far beyond the award.
- The Baldrige framework represents the “leading edge of validated leadership and performance practice,” enabling organizations in every sector of the economy to achieve sustainable high performance across all aspects of their operations.

Role of BPEP Partners

- Baldrige-based organizations outperform their competitors, achieve sustainable results, improve their efficiency and effectiveness, create and save jobs, improve and save lives through lower health care costs and higher quality, and improve educational outcomes.



The ratio of the Baldrige Program's benefits for the U.S. economy to its costs is estimated at **820 to 1**.

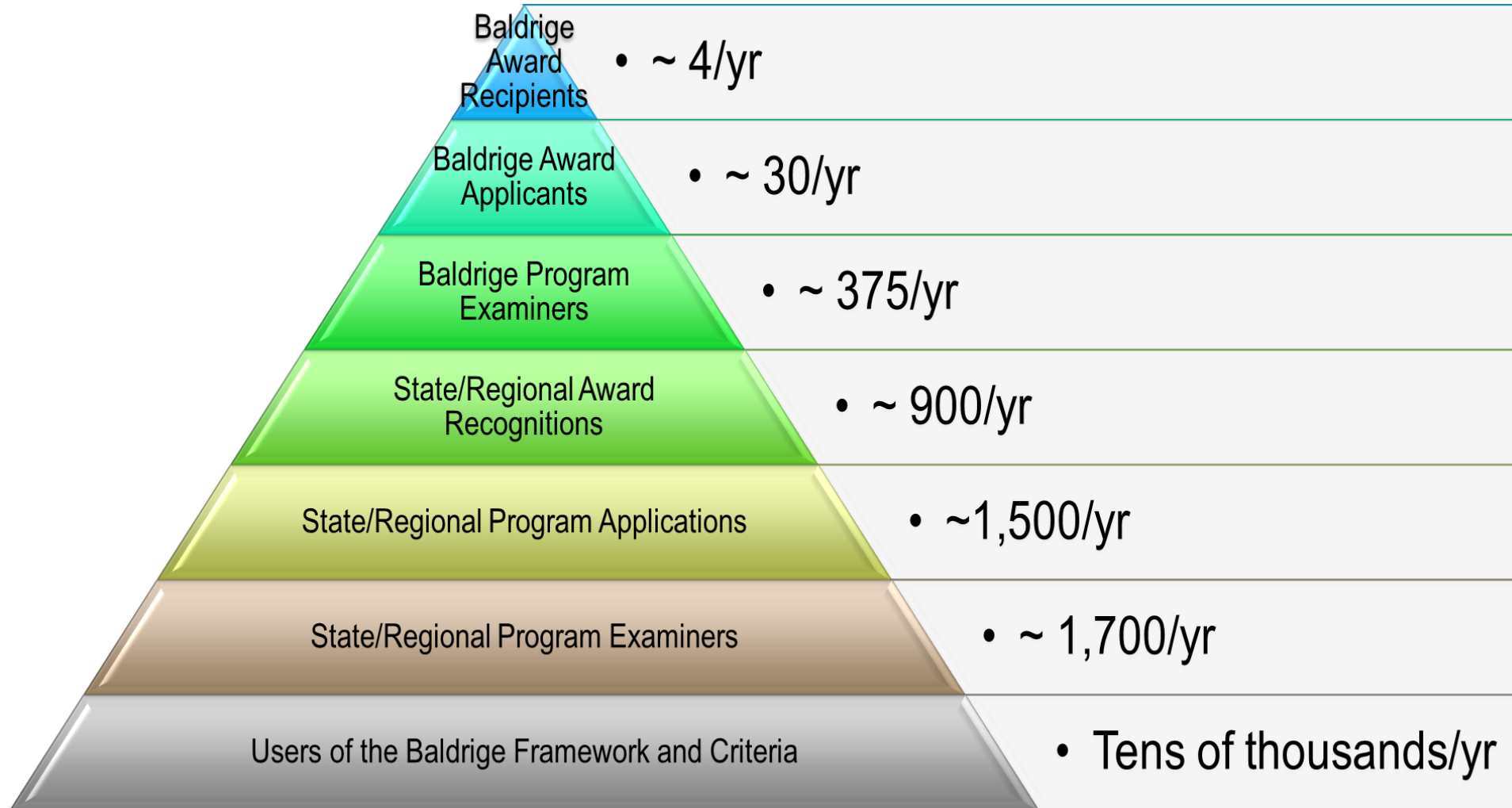
2010–2019 award applicants represent **650,093 jobs**, 3,209 work sites, over \$181 billion in revenue/budgets, and over 590 million customers served.

121 Baldrige Award winners serve as national role models.

348 Baldrige examiners volunteered roughly **\$7.8 million** in services in 2019.

State Baldrige-based examiners volunteered around **\$29 million** in services in 2018.

The Performance Excellence Pyramid



How Can the BPEP help you?

If you are an academic institution:

- Copies of the Baldrige Excellence Framework and other tools
- Educational materials and offerings
- Case studies reflecting implementation of Baldrige criteria
- Application summaries and best practices from Baldrige Award recipients

If you are a company:

- Everything in the left-hand column, plus
 - Assessments and recognition
 - Opportunities to engage with senior leadership of role model organizations
 - Access and connection to a state/regional Baldrige-based program
 - Access and connection to a pool of independent Baldrige consultants

Over
1,400



Manufacturing
Experts

PARTNERS

- Universities, community colleges & technical schools
- Federal agencies & laboratories
- State & local government

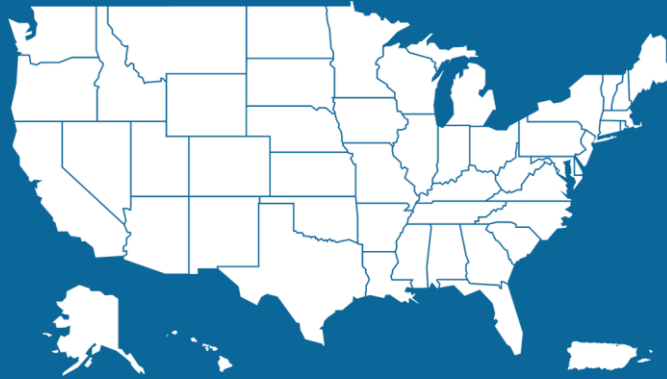
Nearly
2,100



Service
Providers
& Partners

NATIONAL NETWORK

One Center in
Every State and
Puerto Rico



Approx.

375

Service
Locations



Technology

Transfer



Solving industry
challenges together



Advancing U.S. Manufacturing

NIST

Improve

Mitigate

Grow



Connect with NIST MEP: www.nist.gov/mep | mfg@nist.gov



How Can the MEP help you?

- If you are an academic institution:
 - The MEP National Network partners with universities, community college and technical schools to strengthen and empower U.S. manufacturers.
 - 18 of the 51 MEP Centers are university-based.
 - Visit the NIST MEP website (<https://www.nist.gov/mep/mep-national-network>) to connect with your local MEP Center.
- If you are a manufacturer:
 - The MEP National Network offers a wide range of services and initiatives to enable U.S. manufacturers to identify opportunities to accelerate and strengthen growth and competitiveness in the global marketplace.
 - Visit the NIST MEP website (<https://www.nist.gov/mep/mep-national-network>) to connect with your local MEP Center.

Manufacturing USA[®]: Securing U.S. Global Leadership in Advanced Manufacturing

Mission: Connecting people, ideas, and technology

- solve industry-relevant advanced manufacturing challenges
- enhance industrial competitiveness and economic growth
- strengthen our national security

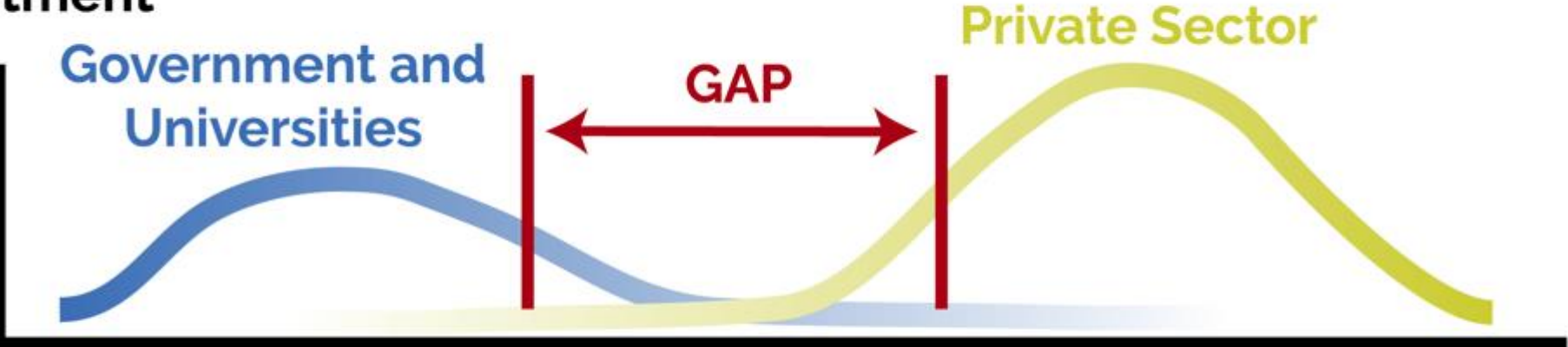
Manufacturing USA Institutes Address the “Scale-Up” Gap

Market Failure in Pre-Competitive Applied Manufacturing R&D

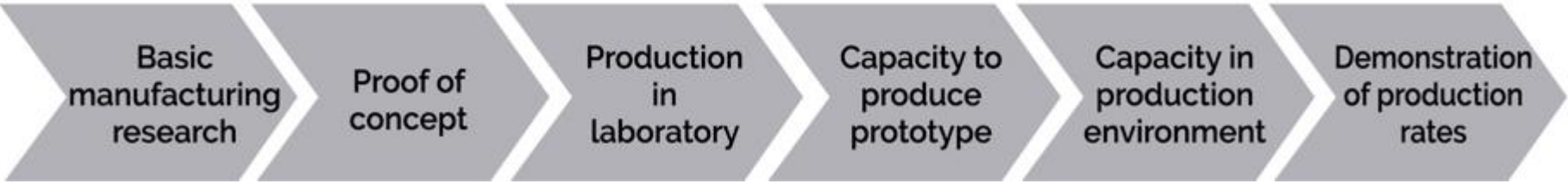
Funding/
Investment

High

Low



Manufacturing-Innovation Process

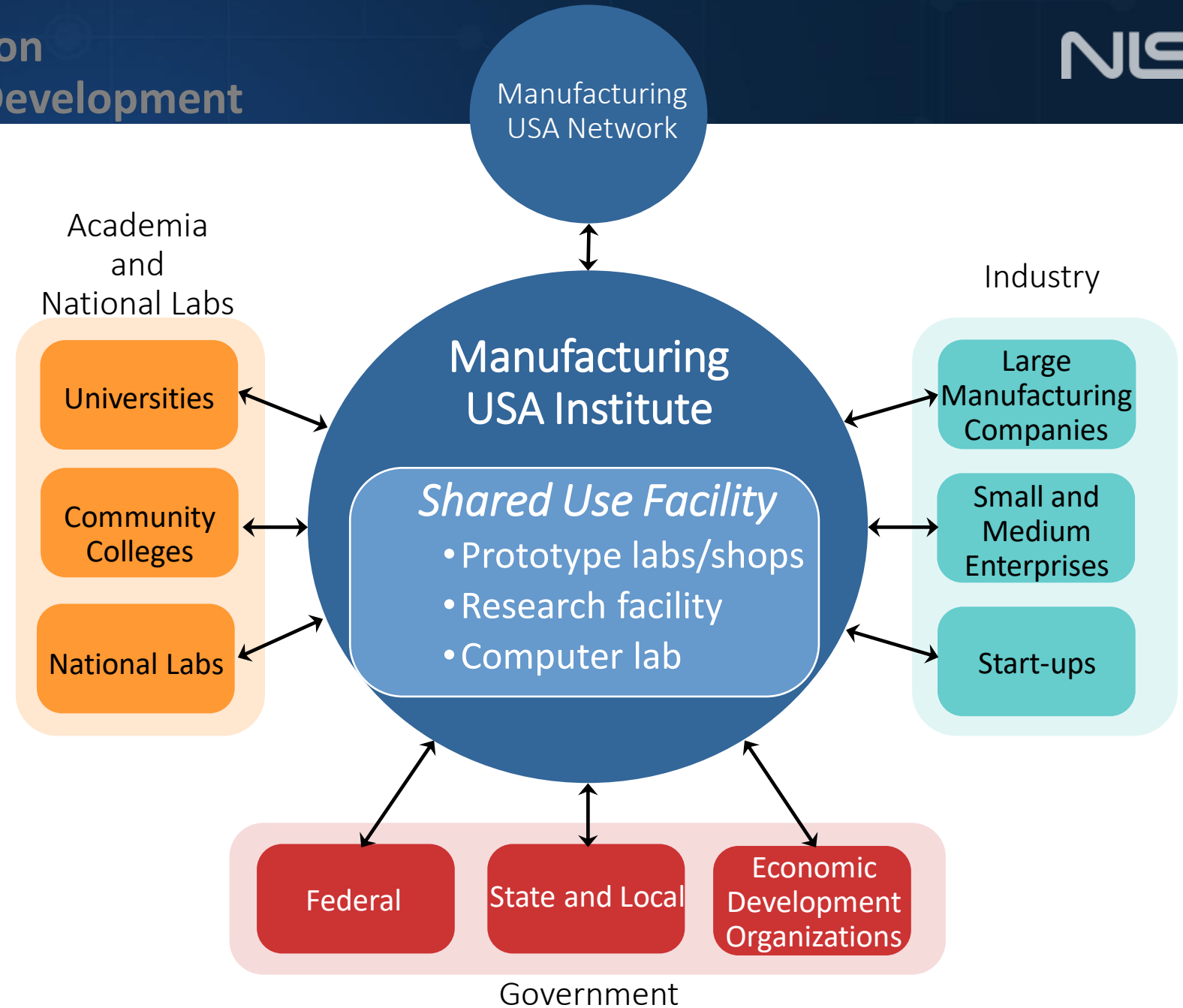


Institute Design:

Large Scale Collaboration on
Technology + Workforce Development



- Each \$70 M - \$110 M federal support over 5 years; matching funds at 1x to 5x
- NIST Engagement – MEP and NIST Labs



Innovation Institutes by Topic

Electronics

Materials

Bio Manufacturing

Energy / Environment

Digital / Automation

**AIM
photonics**
Integrated
Photonics
Albany, NY
Rochester, NY

affoa
Advanced Fibers
and Textiles
Cambridge, MA

NIMBL
Bio-
pharmaceutical
Manufacturing
Newark, DE

RAPID
Transforming Process Industries
Modular
Chemical Process
Intensification
New York, NY

America Makes
Additive
Manufacturing
Youngstown, OH

**Digital
Manufacturing**
Chicago, IL

NEXT FLEX
Flexible
Hybrid
Electronics
San Jose, CA

IACMI
Advanced
Composites
Knoxville, TN

biofabusa
Regenerative
Manufacturing
Manchester, NH

**REMADE
INSTITUTE**
Sustainable
Manufacturing
Rochester, NY

ARM
ADVANCED ROBOTICS
FOR MANUFACTURING
Advanced
Robotics
Pittsburgh, PA

CYMANII
the cybersecurity
manufacturing
innovation institute
Cybersecurity
San Antonio, TX

POWER AMERICA
Wide Bandgap
Semiconductors
Raleigh, NC

lift
Lightweight
Materials
Detroit, MI

**TBA
Bioindustrial
Manufacturing
Institute**

**CLEAN ENERGY
SMART
MANUFACTURING**
Smart
Manufacturing
Los Angeles, CA

New institutes – Q4 2020

Each Institute Advances U.S. Manufacturing

1. Industry-led consortium with a clear mission and unique technology focus based on critical industry need
2. Effective collaboration space for pre-competitive applied R&D, solving big challenges
3. Creates value for industry participation and funding
4. Federal start-up funding must catalyze at least 100% co-investment
5. Addresses the skills gap on education and workforce skills for their technology areas

Collective Institutes' Impacts

14 institutes with
1,920 member
organizations
partnering on grand
challenges

561 major
collaborative
technology and
workforce R&D projects

61% of members are
from industry and
69% are small

\$133M in federal
funds attracts
\$355M in
state/private funds

Thousands of
people trained in
advanced
manufacturing



How Can Manufacturing USA help you?



If you are an educational entity:

- ⚙️ Institutes offer special rates for academic institutions; memberships are organization-based not individual ones
- ⚙️ Institute projects provide opportunities to get involved in applied research and education + workforce training programs
- ⚙️ Projects and internships / fellowships are great learning opportunities for students at any age and degree
- ⚙️ Match teaching and training with on-demand careers and skills

If you are a company:

- ⚙️ Institutes are industry-led, solving problems and accelerating technology prioritized by you
- ⚙️ Access to state-of-the-art equipment and facilities
- ⚙️ Institutes offer a variety of memberships and benefits
- ⚙️ Institute projects link large and small companies to develop new technologies, providing opportunities to connect with potential suppliers and customers
- ⚙️ In general, if you participate on a project you own the IP and benefits

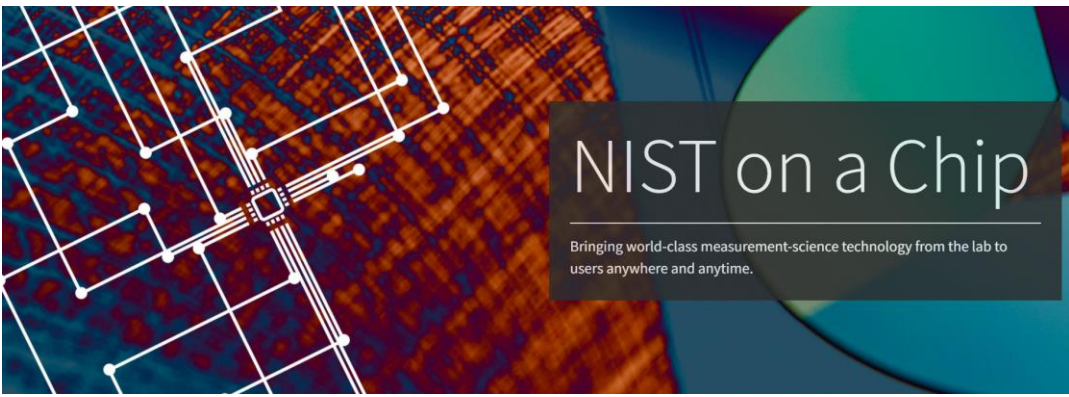
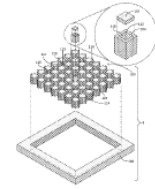
Get involved with the Manufacturing USA institutes:
Visit www.ManufacturingUSA.com or contact AMNPO@NIST.gov to discover collaboration opportunities on technology + workforce development

Technology Partnerships Office Focus on NIST Laboratory Innovation



- Responsible for
 - Serving the T2 needs of the 6 NIST Laboratories
 - Invention harvesting
 - Patent portfolio management
 - Marketing and licensing of NIST inventions
 - Negotiation of legal instruments for the formation of public-private partnerships
 - NIST's Small Business Innovation Research program

(12) United States Patent Simmonds et al.	(10) Patent No.: US 10,444,431 B2 (45) Date of Patent: Oct. 15, 2019
(54) RETICULATED RESONATOR, PROCESS FOR MAKING AND USE OF SAME	(52) U.S. CL. CPC <i>GB2B 6/2225</i> (2013.01), <i>B52Y 2000</i> (2013.01), <i>B52Y 30400</i> (2013.01)
(71) Applicants: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY , Gaithersburg, MD (US); Cindy Regal , Boulder, CO (US); Peu-Li Yu , West Lafayette, IN (US); Yeghshik Tsaturyan , Copenhagen (DK); Thomas P. Purdy , Boulder, CO (US); Nir Shlomo Kampel , Boulder, CO (US)	(58) Field of Classification Search CPC <i>G02B 6/2225</i> ; <i>B52Y 2000</i> ; <i>B52Y 3000</i> (Continued)
(72) Inventors: Raymond W. Simmonds , Boulder, CO (US); Katarina Cvek , Boulder, CO (US); Cindy A. Regal , Boulder, CO (US); Peu-Li Yu , West Lafayette, IN (US); Yeghshik Tsaturyan , Copenhagen (DK); Thomas P. Purdy , Gaithersburg, MD (US); Nir S. Kampel , Boulder, CO (US)	(56) References Cited U.S. PATENT DOCUMENTS 8,067,878 B1* 11/2011 Lu H02N 2/185 316/329 2012/0248460 A1* 10/2012 Abraham C23C 16/01 257/77 (Continued)
(73) Assignee: NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY , Gaithersburg, MD (US)	OTHER PUBLICATIONS P.-L. Yu et al., A phononic bandgap shield for high-Q membrane micromirrors, <i>Applied Physics Letters</i> , 2014, 025110-1-025110-4, vol. 104, AIP Publishing LLC. (Continued)
(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 494 days.	Primary Examiner — Thomas Dougherty (74) <i>Attorney, Agent, or Firm</i> — Office of Chief Counsel for National Institute of Standards and Technology
(21) Appl. No.: 14/995,853	(57) ABSTRACT A reticulated resonator includes: a reticulated substrate that includes: a substrate frame, and a phononic structure in mechanical communication with the substrate frame and including a plurality of unit members arranged in a two-dimensional array; and a membrane disposed on the reticulated substrate. A process for producing a membrane frequency includes: providing a reticulated resonator including a substrate frame; a phononic structure including: a first link connected to the substrate frame; a plurality of unit members arranged in a two-dimensional array and connected to the first link and in mechanical communication with the substrate frame through the first link; and a second link connected to the unit members, a membrane frame connected to the second link and in mechanical communication with the unit members through the second link, and (Continued)
(22) Filed: Jan. 14, 2016	
(65) Prior Publication Data US 2016/0211828 A1 Jul. 21, 2016	
Related U.S. Application Data	
(60) Provisional application No. 62/103,673, filed on Jan. 15, 2015.	
(51) Int. Cl. <i>H01L 41/00</i> (2013.01) <i>G02B 6/222</i> (2006.01) (Continued)	

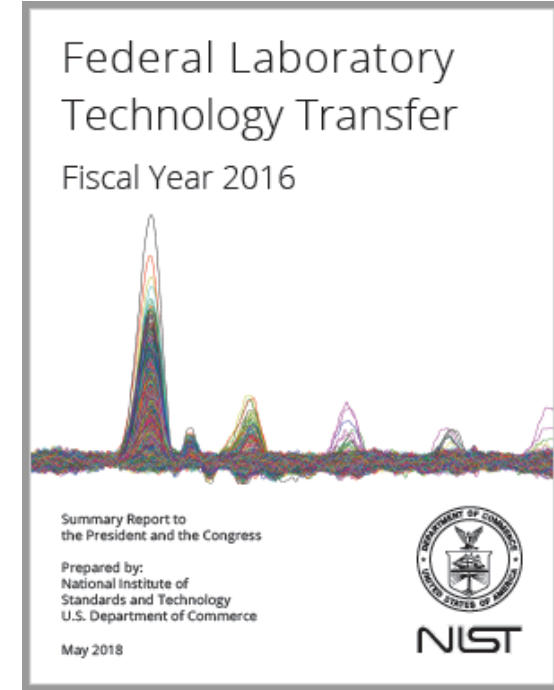


Technology Partnerships Office

Focus on Interagency Leadership

NIST

- Convener and Leader of
 - Interagency Working Group for T2
 - Lab-to-Market subcommittee of NSTC
 - Lab-to-Market Cross Agency Goal reporting
- Host Agency for
 - Federal Laboratory Consortium
- Responsible for cumulative reporting of
 - T2 activities of all Federal research agencies



How can the TPO help you?

If you are an academic institution:

- Material and data transfers
- User Facilities
- Collaborations and Consortia

Mouse Cell
Line
Authentic.

NCCoE

Rapid
Microbial
Testing

Genome
Editing

nSOFT

Flow
Cytometry
Standards

QEDC

If you are a company:

- Material and data transfers
- User Facilities
- Collaborations and Consortia
- Licenses
- SBIR Awards



Thank you for your kind attention!

Mojdeh Bahar

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