Manufacturing USA

An Update on Program Status, Congressional Reauthorization and Key 2020 Initiatives

Visiting Committee on Advanced Technology

February 12, 2020

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

Mike Molnar
NIST Office of Advanced Manufacturing

Manufacturing USA Update

- Current Status
- Reauthorization
- 2020 / 2021 Activities
- Competitive International Programs

NIST Roles in Manufacturing USA

Revitalize American Manufacturing and Innovation Act
enacted December 2014

National Program Office at NIST	Program and Network coordinated & supported by NIST	Annual Congressional Reports, Biennial GAO assessments & Triennial Strategic Plans	DoD and DOE-sponsored institutes are part of network	"Open topic" institute competitions	MEP role in program

NIST Labs Highly Engaged in Manufacturing USA

- Involved in all institute competitions
- Advisory roles in 12 institutes
- Active collaborations in 8 institutes
- NIST lab staff get direct insights on industry measurement and standards needs.

NIST NIIMBL Institute

- **NIIMBL is the NIST-sponsored MFG USA Institute**

  Accelerating Biopharmaceutical Manufacturing innovation
- **Launched March 2017**

  5 year, $189 M public-private partnership
- **$50 M portfolio**

  Technical & workforce development projects
- **New 200,000 sf, $165 million Headquarters**

  Funded by UD & philanthropy – moving in February 24th, formal campus dedication/ribbon cutting Fall 2020
- **140 members:**
  - AstraZeneca, Bristol-Myers Squibb, Eli Lilly, Genentech, Glaxo Smith-Kline, Janssen R&D, Merck, MilliporeSigma, Pfizer, Sartorius.
  - 44 SMEs, 41 research institutions,
    38 community colleges/state/NPOs (4 MEPs), 6 federal agencies

NIIMBL The National Institute for Innovation in Manufacturing Biopharmaceuticals

Project Highlight:
NIIMBL Buffer Stock Blending System

- Global roadmapping collaboration to prototype just-in-time automated solution preparation
- Innovation will reduce both capital and operating costs
- Testbed installation at NIIMBL in March 2020

IMPACT:

Reduce future facilities costs by $20-50 M.

Future conversion to single-use-systems will further reduce capital costs by $100-$300 M.

Other savings –

- 90% reduction in labor for buffer preparation
- Removes manufacturing bottleneck

NIIMBL

Merck
Millipore Sigma
BioPhorum Operations Group
NIIMBL HQ (Newark, DE)

Image: NIIMBL

NIIMBL and NIST: Key Partners in Helping Industry Innovate

NIIMBL mission aligns with NIST's technical portfolio in biomanufacturing, and enhances vital connections to industry for the labs

NIST's role as an 'honest broker' between regulator and regulated industry guides NIIMBL in managing critical stakeholder relationships

NIIMBL can facilitate NIST's standards development mission by leveraging partnerships, materials, ecosystem connectivity

NIST supports supply chain development for new technologies by linking SMMs to institutes through the MEP

NIST facilitates NIIMBL's engagement with other federal agencies

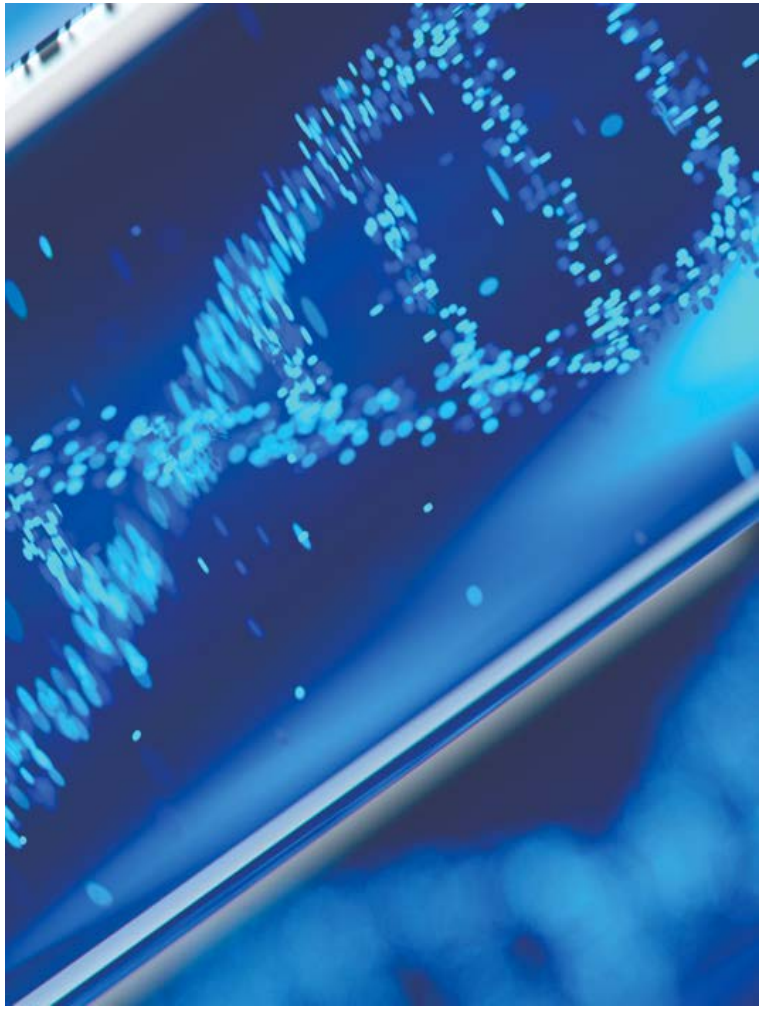


Image: NIIMBL

Manufacturing USA Institutes

Electronics

AIM Photonics
Integrated Photonics
Albany, NY
Rochester, NY

NextFlex
Flexible Hybrid Electronics
San Jose, CA

PowerAmerica
Wide Bandgap Semiconductors
Raleigh, NC

Materials

AFFOA
Advanced Fibers and Textiles
Cambridge, MA

IACMI
Advanced Composites
Knoxville, TN

LIFT
Lightweight Metals
Detroit, MI

Bio Manufacturing

NIIMBL
Bio-pharmaceutical Manufacturing
Newark, DE

BioFabUSA
Regenerative Manufacturing
Manchester, NH

New – 2021 Bioindustrial Mfg. Institute

Energy / Environment

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

REMADE Institute
Sustainable Manufacturing
Rochester, NY

Clean Energy Smart Manufacturing Innovation Institute
Smart Manufacturing
Los Angeles, CA

Digital / Automation

America Makes
Additive Manufacturing
Youngstown, OH

ARM (Advanced Robotics for Manufacturing)
Advanced Robotics
Pittsburgh, PA

MxD
Digital Manufacturing
Chicago, IL

New - 2020 Cybersecurity in Mfg. Institute

Collective Institutes' Impacts

ManufacturingUSA®

Vision: 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

14 institutes and **1,900+** member organizations partnering on grand challenges

476 major collaborative R&D projects

63% of members are from industry and **70%** are small

$183M in federal funds attracts **$304M** in state/private funds

+200,000 people trained in advanced manufacturing

Image: Adobe Stock

New Legislative Reauthorization: Dec 2019

Global Leadership in Advanced Manufacturing (GLAM) Act

Key impacts to NIST:

Ability to *renew* federal funding for any manufacturing institute that meets performance standards

Emphasizes education and workforce development

Authority for pilot programs and public service grants supporting any institute

Encourages new advanced manufacturing institutes

Alliance pathway facilitates private or non-profits joining as Manufacturing USA institutes

NIST OAM Key 2020 Initiative:

Alliance Institute Pathway Development

- Issue NIST RFI for 5 month duration, while convening public outreach roundtables
- Partner with existing manufacturing-related events/conferences to hold roundtables in high impact regions and industry segments
- Plan NIST-sponsored roundtable events in “gap areas”
- Announce plans at IMTS 2020 September, Chicago

NIST OAM Key 2020 Initiative:

Technology Roadmap Competition (AMTech 2020)

AMTech Program:

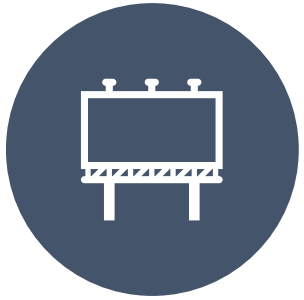
Projects led to at least 5 Manufacturing USA institutes

12 roadmaps used as fundamental guides by Manufacturing USA institutes

Several other consortia continue to operate

2020 budget provided $1M to OAM for funding technology roadmapping competitions for promising advanced manufacturing areas

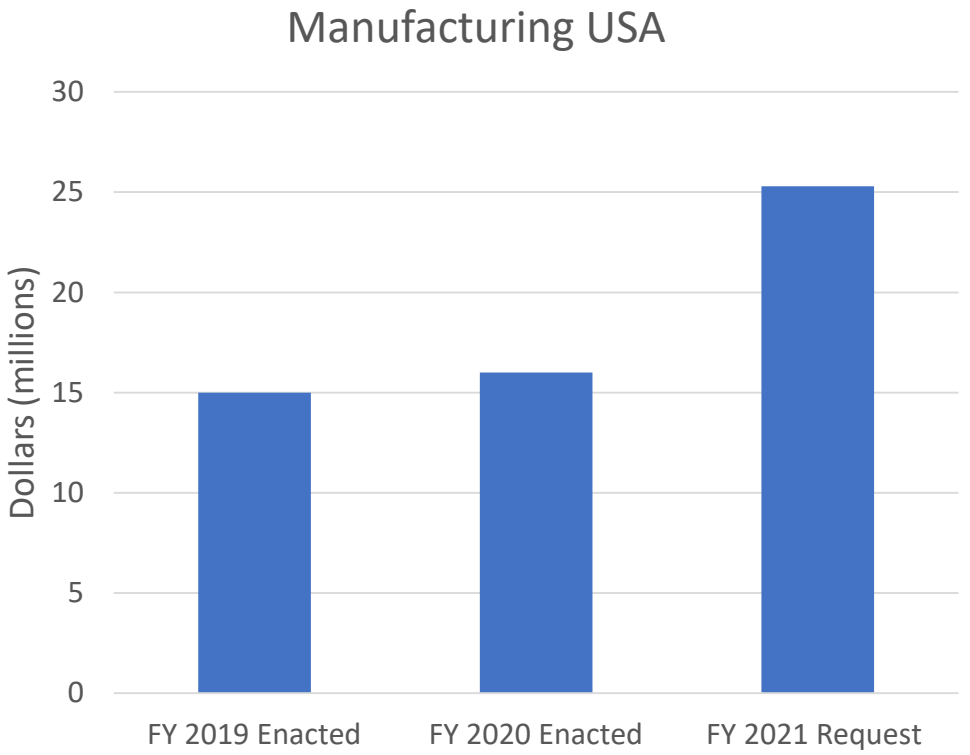
Preparing a Notice of Funding Opportunity and seeking additional funds



Expecting 5-7 awards to begin in FY2021

FY21 look ahead: President's Budget Request

- NIST to continue coordinating/supporting Network
- Conclude funding of first NIST-sponsored institute
- Launch competition for a new NIST-sponsored institute

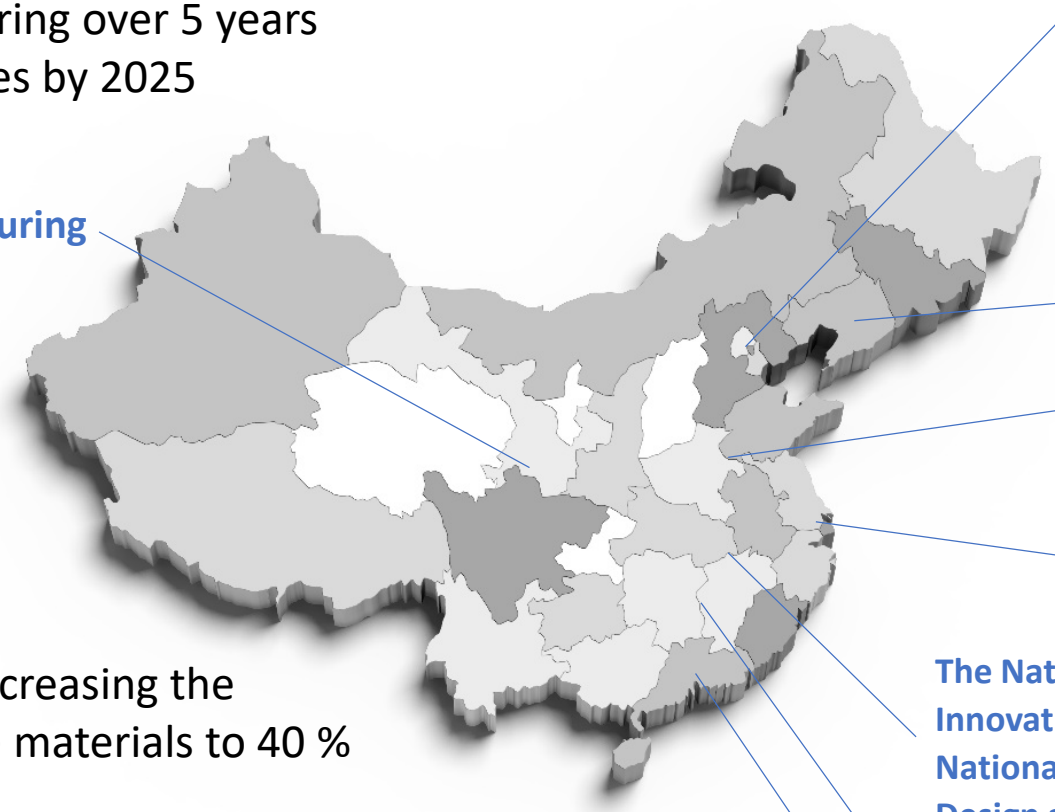


FY 2020 Enacted	FY 2021 Request	Difference	
$16.0	$25.3	$9.3	+58.1%

Manufacturing Innovation Centers in China

Made in China 2025

- $300 billion investment in manufacturing over 5 years
- 40 Manufacturing Innovation Institutes by 2025



Power Battery Manufacturing Innovation Center
Lightweight Materials Technology
National Intelligent Connected Vehicle Innovation Center
National Robot Innovation Center
National Agriculture Machine Innovation Center
The National Integrated Circuit Innovation Center
Smart Sensor Innovation Center
The National Information Optoelectronics Innovation Center
National Innovation Institute of Digital Design and Manufacturing
Rail Transportation Equipment
National Printing and Flexible Display Innovation Center
The National Institute of Additive Manufacturing

Blue = Benchmarked

- Advanced Manufacturing goals Increasing the Chinese-domestic content of core materials to 40 % by 2020 and 70 % by 2025
- 4 Focus Areas:
  - Indigenous innovation and IP
  - Domestic brands
  - Secure, controllable standards
  - Localization of production and data

Image: Adobe Stock

OAM China Manufacturing Innovation Centers

Benchmark Tour

- China closely studies and models Manufacturing USA
- Visited 8 institutes, met with senior leaders and numerous architects of *Made in China 2025*

Takeaways:

- China views "*Manufacturing is the foundation of a country*"
- China invests massively on developing manufacturing technology in order to capitalize on transitioning global innovations into products
- China is currently #1 in manufacturing, #1 in growth rate, #1 in manufacturing R&D, and has concrete plans to dominate manufacturing of advanced technology products
- U.S. manufacturing of high technology products is under threat of losing leadership in a position we have long enjoyed

China's new Robotics Innovation Institute

Images: NIST OAM

China's new Digital Manufacturing Institute