



UNIVERSITY SYSTEM  
*of* MARYLAND

## **Agenda Item 3**

# **NIIMBL Grant Presentation**

SUMMARY OF ITEM FOR ACTION  
**INFORMATION** OR DISCUSSION

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**TOPIC:** NIIMBL Grant Presentation (information item)

**COMMITTEE:** Economic Development and Technology Commercialization

**DATE OF COMMITTEE MEETING:** January 26, 2017

**SUMMARY:** As part of a national public-private partnership, the USM (UMB and UMCP) will be a key partner to leverage a \$70 million cost-shared agreement with NIST to advance U.S. competitiveness in biopharmaceutical manufacturing through the establishment of the National Institute for Innovation in Manufacturing Biopharmaceuticals (NIIMBL).

Much of the research and collaboration with NIST will take place at USM's Institute for Bioscience and Biotechnology research (IBBR) at Shady Grove. NIIMBL will help to advance U.S. leadership in the biopharmaceutical industry, foster economic development, improve medical treatments and ensure a qualified workforce by collaborating with educational institutions to develop new training programs matched to specific biopharma skill needs. In addition to the federal funding, the new institute is supported by an initial private investment of at least \$129 million from a consortium of 150 companies, educational institutions, research centers, coordinating bodies, non-profits and Manufacturing Extension Partnerships across the country. The consortium is establishing a new non-profit organization called USA Bio LLC to administer the cooperative agreement with NIST. Dr. Bill Bentley, co-PI for the NIIMBL proposal and director of the Robert E. Fischell Institute for Biomedical Devices, will brief the Committee on this initiative.

**ALTERNATIVE(S):** This item is for information purposes.

**FISCAL IMPACT:** This item is for information purposes.

**CHANCELLOR'S RECOMMENDATION:** This item is for information purposes.

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COMMITTEE RECOMMENDATION:

DATE:

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BOARD ACTION:

DATE:

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SUBMITTED BY: Tom Sadowski / Suresh Balakrishnan (301) 445-2783

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# **Committee on Economic Development and Technology Commercialization**

**NIIMBL Grant Presentation**

**January 26, 2017**





The National Institute for Innovation in Manufacturing Biopharmaceuticals

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**AMERICAN INNOVATION AT WORK**

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William E. Bentley, Co-PI

Robert E. Fischell Distinguished Chair in Engineering  
University of Maryland

# Our Mission

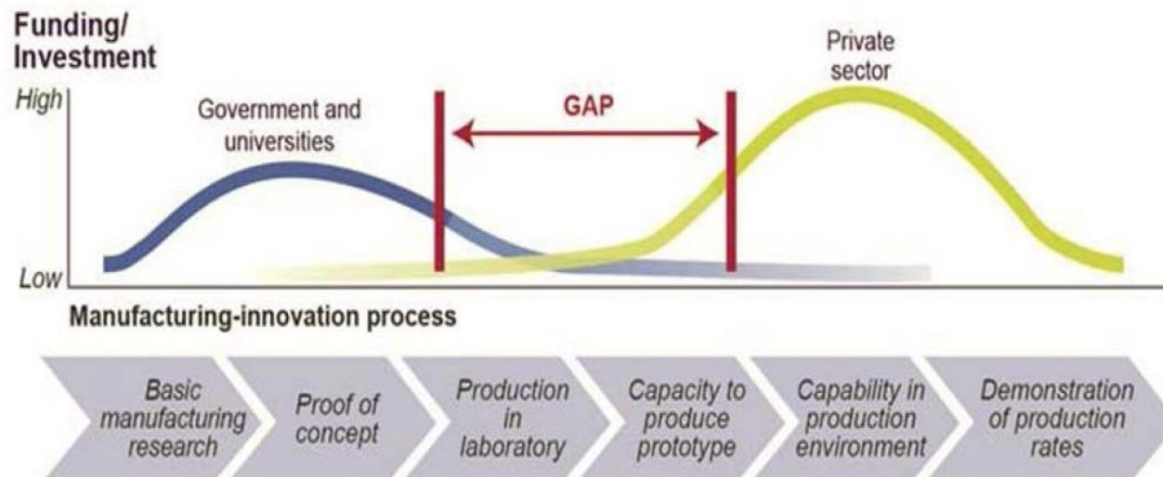
The NIIMBL mission is to accelerate biopharmaceutical manufacturing innovation, support the development of standards that enable more efficient and rapid manufacturing capabilities, and educate and train a world-leading biopharmaceutical manufacturing workforce, fundamentally advancing U.S. competitiveness in this industry.



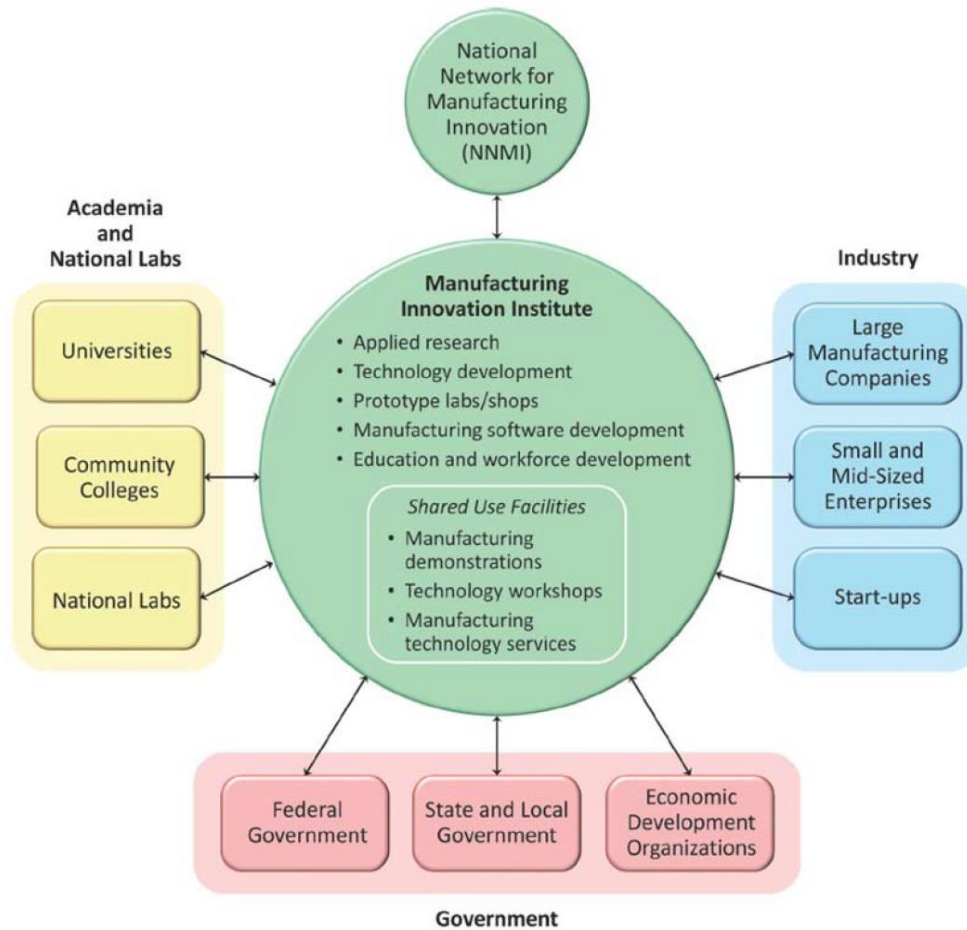
# Manufacturing USA Network of Institutes

Focus is to address market failure of insufficient industry R&D in the “missing middle” to de-risk/speed-up promising new technologies

AND address the education and workforce gaps on these technologies



Slide Credit: Mike Molnar, Director  
NIST Advanced Manufacturing Office

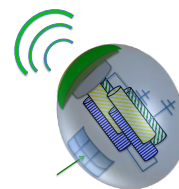
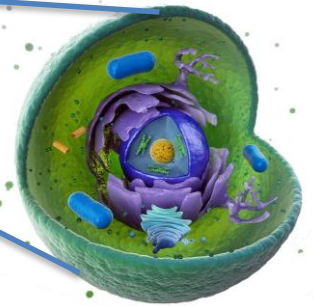
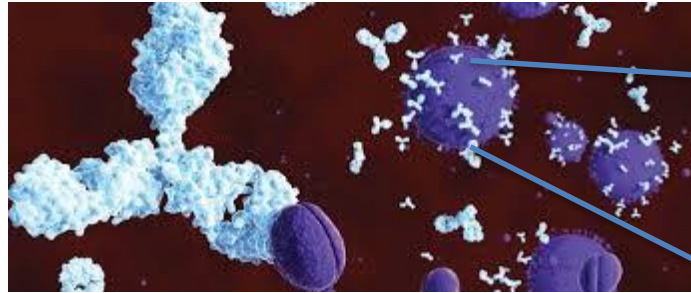


**Other launched NNMI institutes:**

- Flexible Hybrid Electronics
- Additive Manufacturing
- Integrated Photonics
- Digital Mfg & Design
- Light Metal Manufacturing
- Advanced Composites
- Wide Bandgap Semiconductors
- Advanced Textiles
- Smart Manufacturing
- RAPID Process Intensification

Slide Credit: Mike Molnar, Director  
NIST Advanced Manufacturing Office

# What is Biomanufacturing?





# A Significant U.S. Impact (2014)



853,818

Direct Jobs  
(33% are STEM Occupations)

4,446,365

Total U.S. Jobs



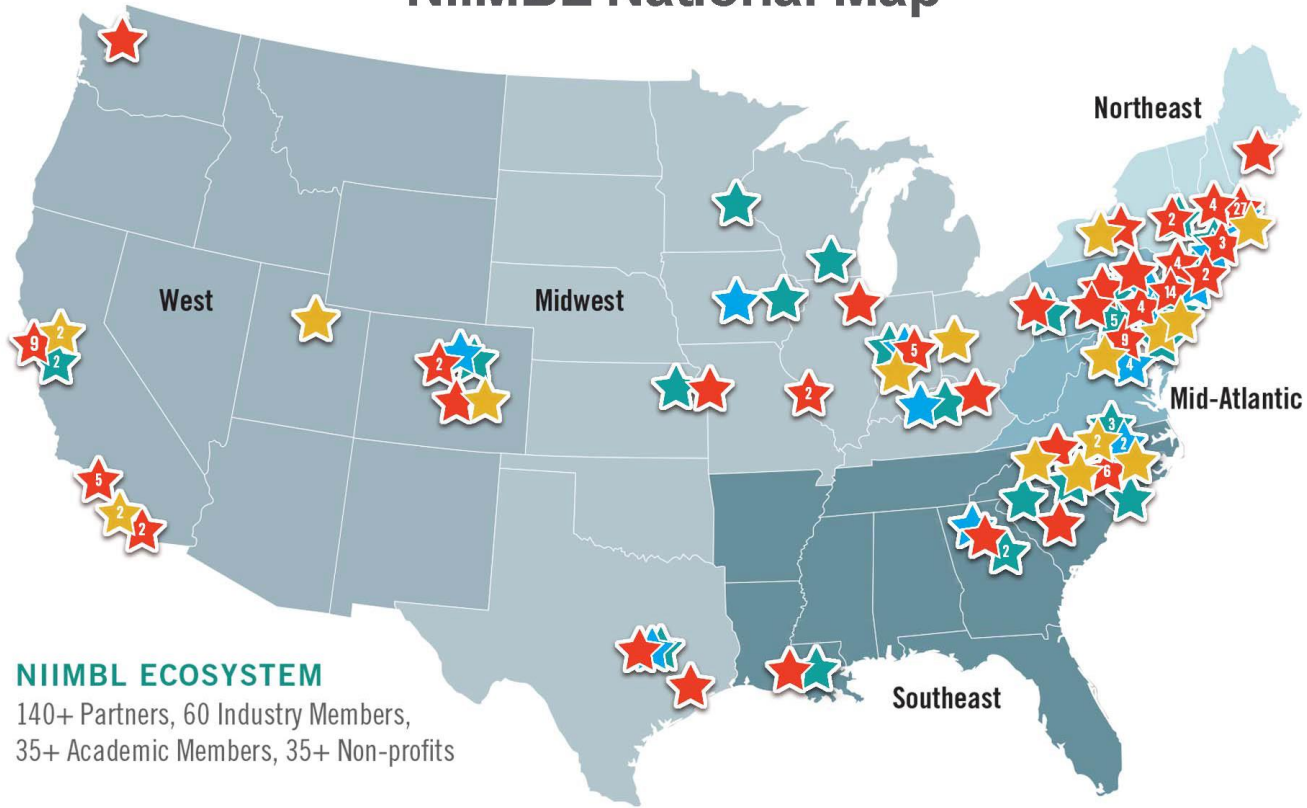
\$1.2 Trillion  
U.S. Economic Output

U.S. economic output represents the value of goods and services produced by the sector.

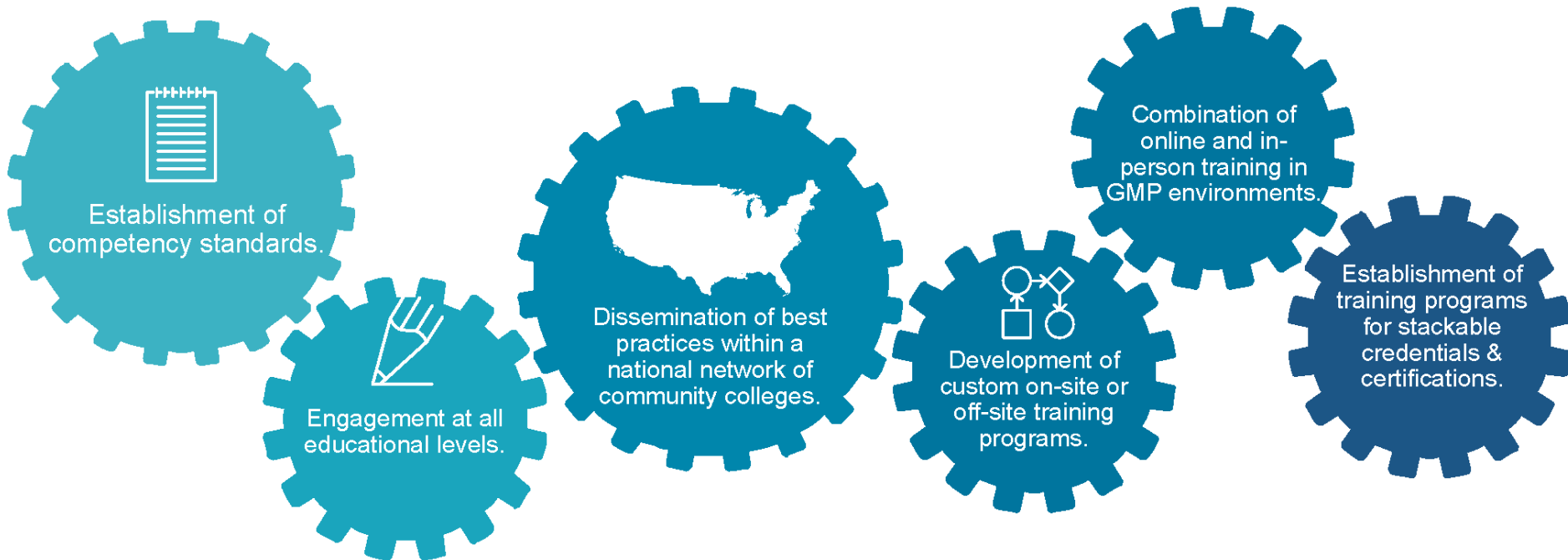


SOURCE: The Economic Impact of the Biopharmaceutical Industry: U.S. and State Estimates, May 2016.

# NIIMBL National Map



# Education and Workforce Training Program





### Expertise & Facilities

Broad expertise among partners and a national network of shared facilities for prototyping and demonstration projects.



### 140+ Partners

A public-private partnership of industry, academic, and government entities.



### \$250M / 5 yrs

Extensive commitments from partners will leverage \$70M Federal funding.



### Best-In-Class Workforce

Built upon high impact biopharmaceutical manufacturing workforce training paradigms.

# NIIMBL

The National Institute for Innovation in Manufacturing Biopharmaceuticals

## MARYLAND



### Strengths

#### Bioprocessing

- Continuous
- Cell expansion

#### Process Analytical Tech.

- Fischell Inst. Biomed. Devices
- Protein Characterization

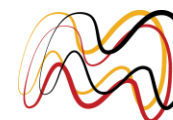
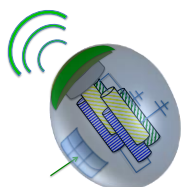
#### Integrated Teams

- Company/NIST/FDA/Univ.

#### Integrated Facilities

- nonGMP training
- Bioprocess testing

New devices/methodologies  
for  
process/product analysis



UNIVERSITY OF MARYLAND | NIST  
INSTITUTE FOR BIOSCIENCE  
& BIOTECHNOLOGY RESEARCH

insight | innovation | application

Potential partners

abbvie

genzyme

**NIIMBL**

The National Institute for Innovation in Manufacturing Biopharmaceuticals

**M** MILLIPORE

REGENERON



Bristol-Myers Squibb

**FDA**



**MERCK**



**Lonza**



Boehringer Ingelheim



Agilent Technologies

eppendorf

Shire



GREEN CROSS HEALTH



UNIVERSITY of MARYLAND THE FOUNDING CAMPUS

**Genentech**

Waters

THE SCIENCE OF WHAT'S POSSIBLE.™

Georgia Tech



BioFutura

bteco  
Biomanufacturing Training and Education Center



Rensselaer



Biogen



MIT Massachusetts Institute of Technology

IMMUNOGEN

BOMARIN



UNIVERSITY OF MARYLAND

**FLUOR**



sartorius

**NIST**

Patheon

Pfizer

PALL

UMASS LOWELL

NC STATE UNIVERSITY

Lilly

Tulane University



GE Healthcare

ALEXION



GB|S|I

gsk



GILEAD

Johnson & Johnson

CLEMSON UNIVERSITY



Thank you for your attention!