The National Network for Manufacturing Innovation

Briefing for the 2017 ASEE Public Policy Colloquium

Mike Molnar, Director-Advanced Manufacturing National Program Office
An interagency team building partnerships with U.S. Industry and Academia
Many issues today involve science and technology

ASEE Engineering Congressional input is critical to sound policy

Of the 535 Members of the 115th Congress, 2% (13) have engineering expertise

- Senator Steve Daines (R-MT) - B.S. chemical engineering 1984
- Senator Martin Heinrich (D-NM) - B.S. mechanical engineering 1995
- Rep. Joe Barton (R-TX) - B.S. industrial engineering 1972
- Rep. Tony Cárdenas (D-CA) - B.S. electrical engineering 1986
- Rep. Chris Collins (R-NY) - B.S. mechanical engineering 1972
- Rep. Raja Krishnamoorthi (D-IL) - B.S. mechanical & aerospace engr. 1991
- Rep. Daniel Lipinski (D-IL) - B.S. mechanical engineering 1988
- Rep. Thomas Massie (R-KY) - S.M. mechanical engineering 1996
- Rep. David McKinley (R-WV) - B.S. civil engineering 1969
- Rep. Brad Schneider (D-IL) - B.S. industrial engineering 1983
- Rep. Paul Tonko (D-NY) - B.S. mechanical & industrial engineering 1971
- Rep. Bruce Westerman (R-AR) - B.S. biological & agricultural engr. 1990
President’s Council of Advisors on Science and Technology

Market Failure in Pre-Competitive Applied Manufacturing R&D

National Network for Manufacturing Innovation creates the space for industry and academia to work on industry-relevant problems

- Addresses the market failure of industry underinvestment in “pre-competitive” applied R&D
- Focuses on “de-risking” new technologies and materials to scale-up for U.S. manufacturers
Federal startup investment: $70M - $120M/institute over 5 years
Institute Consortium owners must have minimum 1:1 co-investment

Manufacturing Institute Framework

Applied Research + Education/Workforce Skills = Development of Future “Manufacturing Hubs”

- Federal funding is the **catalyst** to bring stakeholders into shared space to de-risk innovation.
- Focus is on **industry-relevant problems** impacting commercial production, MRL 4-7.
- Institutes must be **self-sustaining** after federal startup investment ends.
- **Workforce training and development** is an essential component in institute focus.

White House Report
Framework Design
January 2013
Manufacturing USA Strategic Goals

• Increase the competitiveness of U.S. manufacturing.

• Facilitate the transition of innovative technologies into scalable, cost-effective, and high-performing domestic manufacturing capabilities.

• Accelerate the development of an advanced manufacturing workforce.

• Support business models that help institutes become stable and sustainable.

Manufacturing USA Today

Shaded states have major participants in Manufacturing USA Institutes

- Lightweight Metals Detroit, MI
- Advanced Robotics Pittsburgh, PA
- AIM Photonics Rochester, NY
- REMADE Rochester, NY
- Advanced Tissue Biofabrication, Manchester, NH
- AFFOA - Fibers and Textiles, Cambridge MA
- Modular Chemical Process Intensification New York, NY
- Bio-pharmaceutical Manufacturing Newark, DE
- Digital Mfg & Design Chicago, IL
- Advanced Fiber-Reinforced Polymer Composites Knoxville, TN
- America Makes
- Additive Manufacturing Youngstown, OH
- Wide Bandgap Semiconductors Raleigh, NC

Flexible Hybrid Electronics San Jose, CA
Smart Manufacturing Los Angeles, CA
1) Each Institute has a clear mission based on a critical Industry need

Our Mission

The NIMBL 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.
2) Each Institute creates value for industry participation and funding

A place where industry, academic, state, and U.S. federal resources synergize to
- meet industry’s needs
- de-risk and streamline process development
- train a growing workforce spanning the full supply chain

- Regulatory advancement is streamlined
- Enhanced process robustness is obtained
- Major manufacturers work with suppliers to develop new technologies
- Standardization of interfaces, assays, parts, and certifications is achieved
- New methods, technologies, and best practices are achieved collaboratively with health authorities
- Workforce creation matches industry needs
3) **Each Institute is operated by an industry-led consortium**

NIIMBL: national impact with shared resources in West, Midwest, Southeast, Mid-Atlantic, and Northeast regional hubs, operated by USA Bio LLC

- NIIMBL Members span the entire biopharmaceutical manufacturing ecosystem
- 150 members pending at launch:
  - 103 companies, trade groups, and non-profits
  - 41 academic partners
- 25 states represented in NIIMBL consortium
4) Each Institute works on the industry priorities and big challenges only solvable by collaboration.
5) Each Institute manages a balanced portfolio of real projects for industry

- NIIMBL plans two project calls per year in ongoing operations.
- ‘Quick Start’ project calls will be issued at close of the start-up phase.
- A regulatory coordination committee may issue special project calls at any time.
Third Party Assessment Commissioned

Deloitte studied key areas in order to evaluate and assess Manufacturing USA’s national-level impacts, including:

• Program Theory and Structure
  – Is the program doing the right things?
  – Is the program meeting objectives / impacts?
• Program progress
  – How is the program performing, achieving its objectives, and creating impact?
  – Qualitatively, what are case studies / examples of impact?
  – Quantitatively, what does the data tell us about impact?
• Recommendations
  – What can be improved?
Deloitte conducted:
- Extensive interviews
- Site visits to all the institutes
- Review of institute data
- Research on comparable international efforts

More than 200 institute and program stakeholders were engaged in a crowd discussion to generate powerful insights in support of study findings.
Formation of Regional Clusters

Manufacturing USA shows signs of strengthening regional economic clusters

Inset: Advanced Manufacturing Ecosystem in Detroit, MI – Anchored by the LIFT Institute

63 organizations from across seven Institutes have generated 125 connections
The Power of Connections

Manufacturing USA Institutes address the “valley of death” through seed funding and by bringing together stakeholders to commercialize advanced technologies.

Some organizations in the outer “fans” take advantage of the convening power of the Institutes to keep abreast of developments in their technology area and network with their peers.

Organizations in the center of the network are highly involved in projects across multiple institutes and help steer the direction of the network.

Together, the Institutes’ convene nearly 1,200 organizations in an inter-industry network comprised of 9,000+ organization relationships.

**Statistics:**
- 9,424 Relationships between organizations
- 1,174 Organizations involved with the program
- 753 Organizations with formal membership
- 203 Organizations have relationships with multiple institutes
- 120 Organizations are members of more than one institute
Collaboration Multiplier Effect

• Institutes decrease the cost of experimentation for their members by providing access to cost prohibitive equipment and pooling R&D dollars.
  – Institutes are demonstrating the potential to deliver 5x leveraged value for members
  – Institutes give members access to not only government funding and partner funding on projects but also broader IP portfolios and R&D

PowerAmerica Institute member facility.

DMDII Facility in Chicago, Illinois
Third Party Assessment Findings & Program Progress

Key Findings - Manufacturing USA Spurs R&D Innovation

- The Program is a highly effective ecosystem convener
- Institutes are demonstrating the potential to deliver 5x leveraged value for members
- Institutes are successfully planning for sustainability independent of U.S. government influence

Progress to Date

- As of today, 14 institutes launched - $1 billion federal investment matched by over $2 billion non-federal
- Of Eight active institutes: 1,300 members, over 240 technology development projects.
  - Members include two-thirds of Fortune 50 U.S. manufacturers
  - 8 out of the 10 top-ranked research and engineering universities.