

# BLUEPRINT FOR ACTION

Workshop on the Design of the

**National Network for Manufacturing Innovation**

## *The Proposed NNMI Design*

Mike Molnar

Advanced Manufacturing National Program Office



# Agenda

- NNMI Milestones and Vision
- The Missing Middle Challenge – NNMI Positioning
- NNMI Design Process
- Institute Design Diagram
- NNMI Characteristics
- Investment Plan and Selection Criteria
- Workshop Mission Today

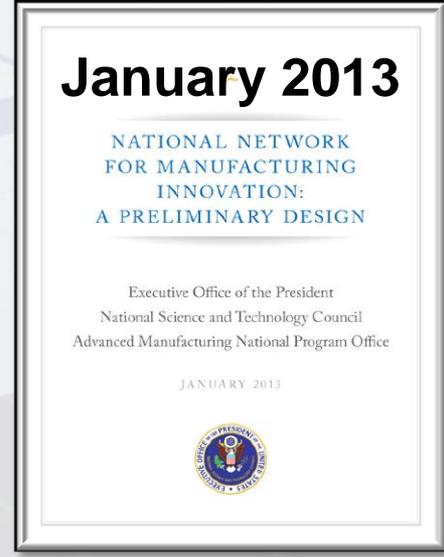
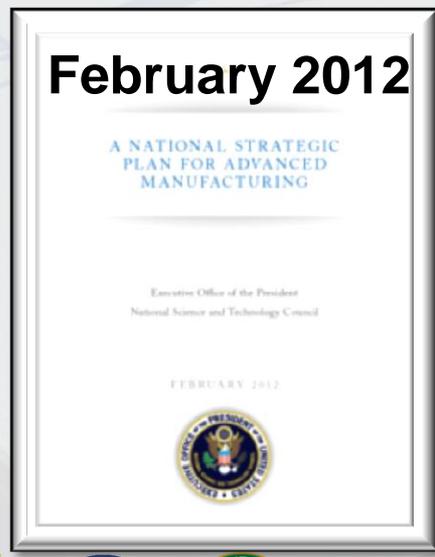


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# Policy Milestones



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# Vision of the NNMI



President Obama at Rolls-Royce Crosspointe  
Petersburg, VA, March 9, 2012

**\$1 billion FY13 proposal:**  
*“institutes of manufacturing excellence where some of our most advanced engineering schools and our most innovative manufacturers collaborate on new ideas, new technology, new methods, new processes.”*



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# Proposed NNMI Scope

- Up to 15 linked regional clusters of manufacturing innovation across the country, each with a unique focus
- Shared approaches to infrastructure, intellectual property, contract research, and performance metrics



As nodes of a network, the Institutes for Manufacturing Innovation complement each other's capabilities

Credit: B. Young/NIST



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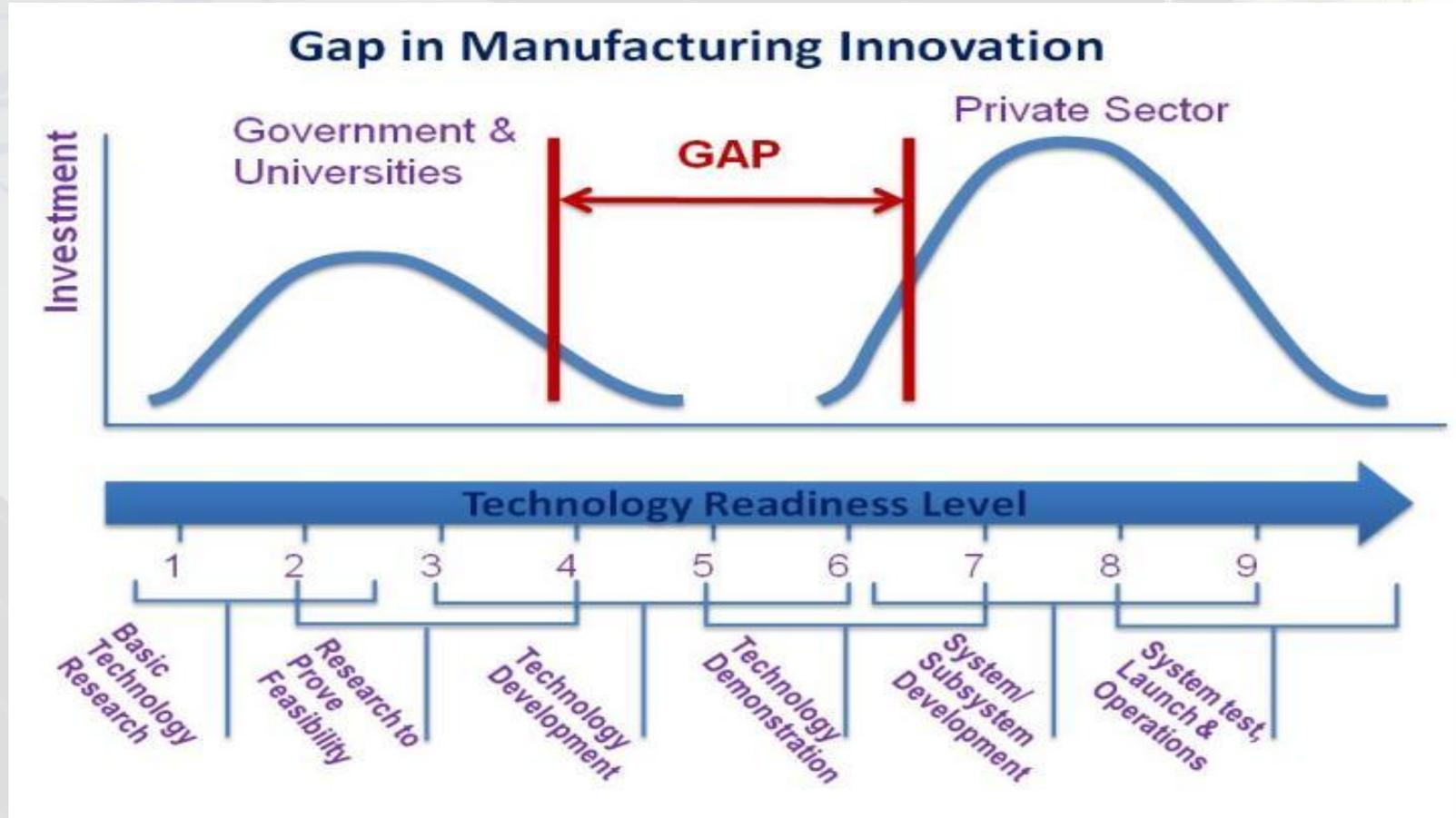
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# The Missing Middle - Valley of Death

*Not about government spend in TRL 4-7 projects!*



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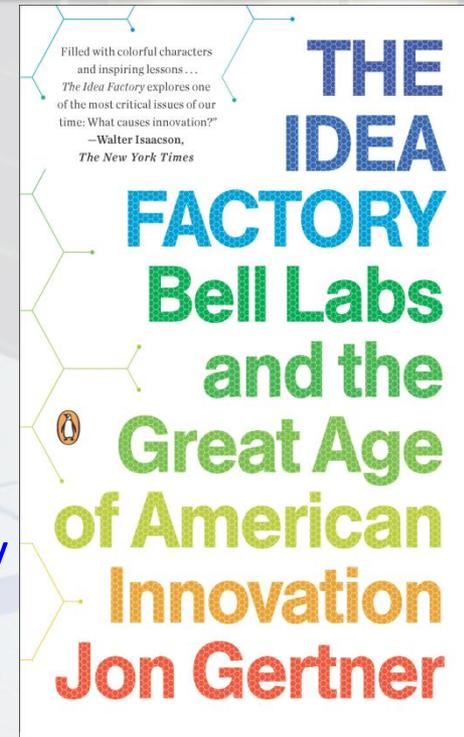
# The “missing Bell Labs”

**Innovation:** a “total process” of interrelated parts towards an industrial goal. *You have NOT innovated if...*

- 1) If you haven't manufactured it in substantial quantities
- 2) You haven't found a market to sell the product

## The Bell Labs “secret sauce”

- Have interdisciplinary mixes, and open doors
- Attract best expertise, build critical mass of size and quality
- Technically qualified management
- Mix of near, medium and long term projects
- Have a strong manufacturing link – Bell System's problems drove solutions



**Jon Gertner**  
*Editor-at-large* Fast Company

**NIST Colloquium**  
**Friday, January 11**



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# Manufacturing at Scale

*an Integral Part of the Innovation Ecosystem*

U.S. innovation / production cycle is often viewed as linear and separate

## INNOVATION PROCESS



### Significant national focus

Innovation clusters and government agency support  
Multiple collaborative efforts  
Government and private sector investments

\*including commercialization

## PRODUCTION PROCESS



### Limited national focus

Lack of coordinated efforts  
Barriers to production at scale  
Few government investments and incentives  
Regulatory and tax policy hurdles

U.S. innovation and manufacturing require full life-cycle support to maximize return on innovation



For illustrative purposes.

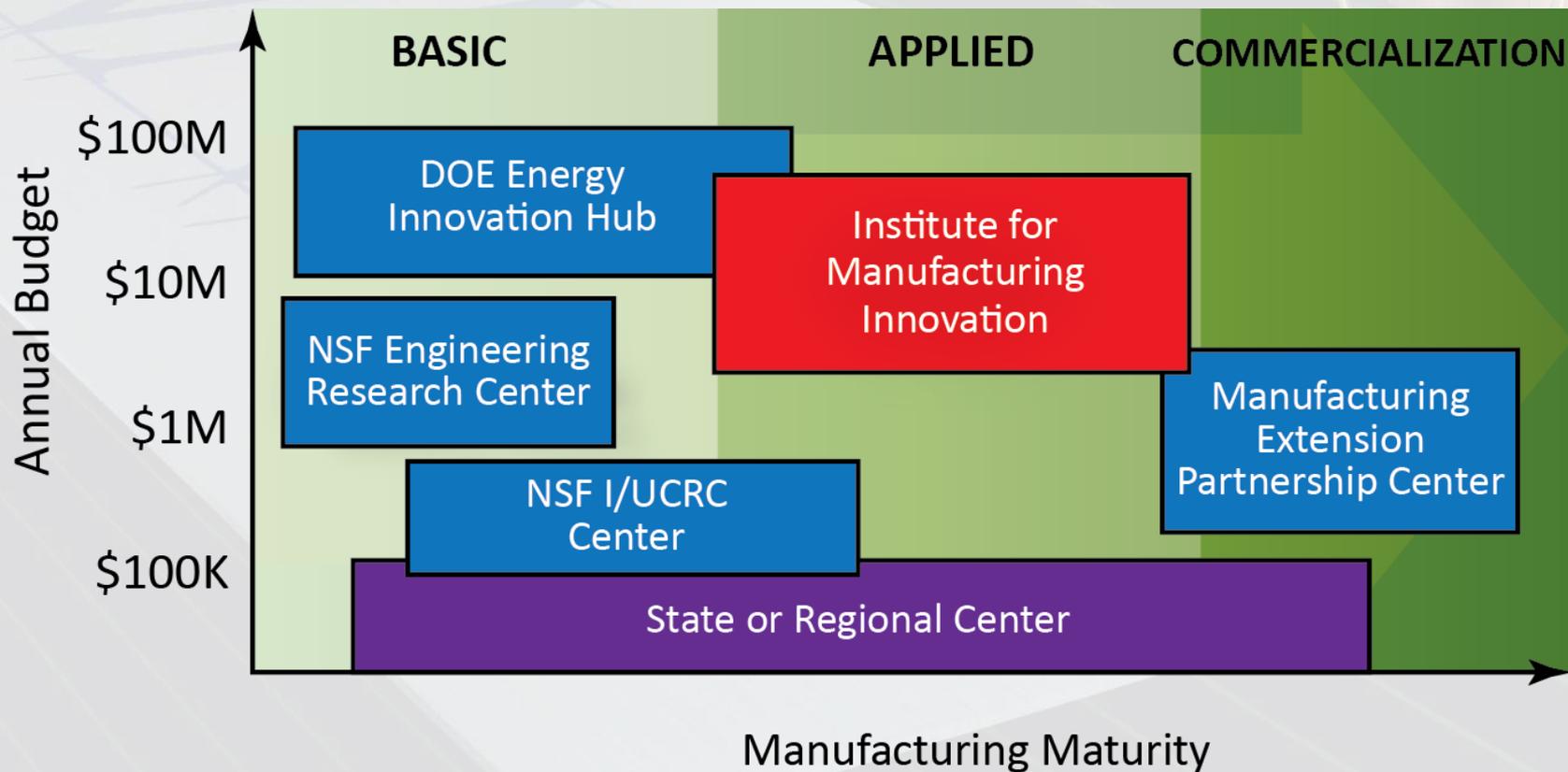


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# Focus on Scale Up – The Missing Middle

Basic science  
Largely government funded

Commercialization  
private sector owned/funded



Manufacturing Maturity

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# NNMI Positioning:

## Creating a Partnership Space for Industry

The Federal investment in the National Network for Manufacturing Innovation (NNMI) serves to create an effective manufacturing research infrastructure for U.S. industry and academia to solve industry-relevant problems. The NNMI will consist of linked Institutes for Manufacturing Innovation (IMIs) with common goals, but unique concentrations. In an IMI, industry, academia, and government partners leverage existing resources, collaborate, and co-invest to nurture manufacturing innovation and accelerate commercialization.

As sustainable manufacturing innovation hubs, IMIs will create, showcase, and deploy new capabilities, new products, and new processes that can impact commercial production. They will build workforce skills at all levels and enhance manufacturing capabilities in companies large and small. Institutes will draw together the best talents and capabilities from all the partners to build the proving grounds where innovations flourish and to help advance American domestic manufacturing.



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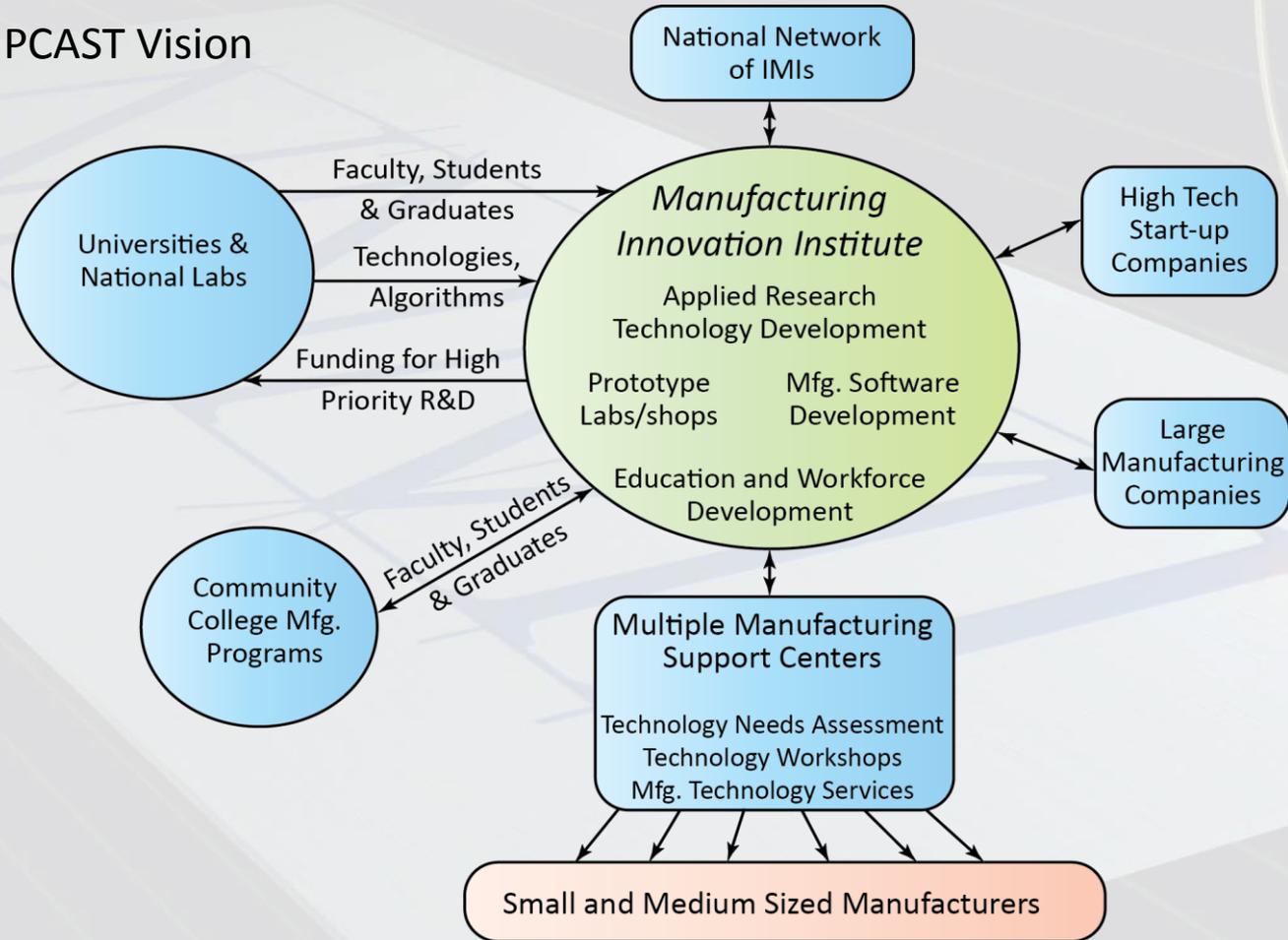
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# Institute Structure – Original AMP/PCAST Report Vision

## Original PCAST Vision



# Crowdsourcing: Design for Impact Workshops & RFI



Rensselaer Polytechnic Institute  
April 25, Troy New York



Cuyahoga Community College  
July 9, Cleveland Ohio

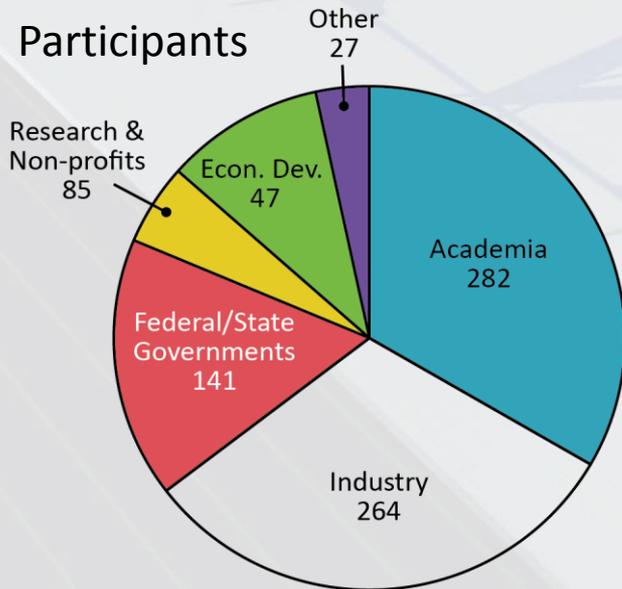


National Academies Beckman Center  
September 27, Irvine California



Univ. Colorado  
October 18, Boulder, Colorado

## Participants



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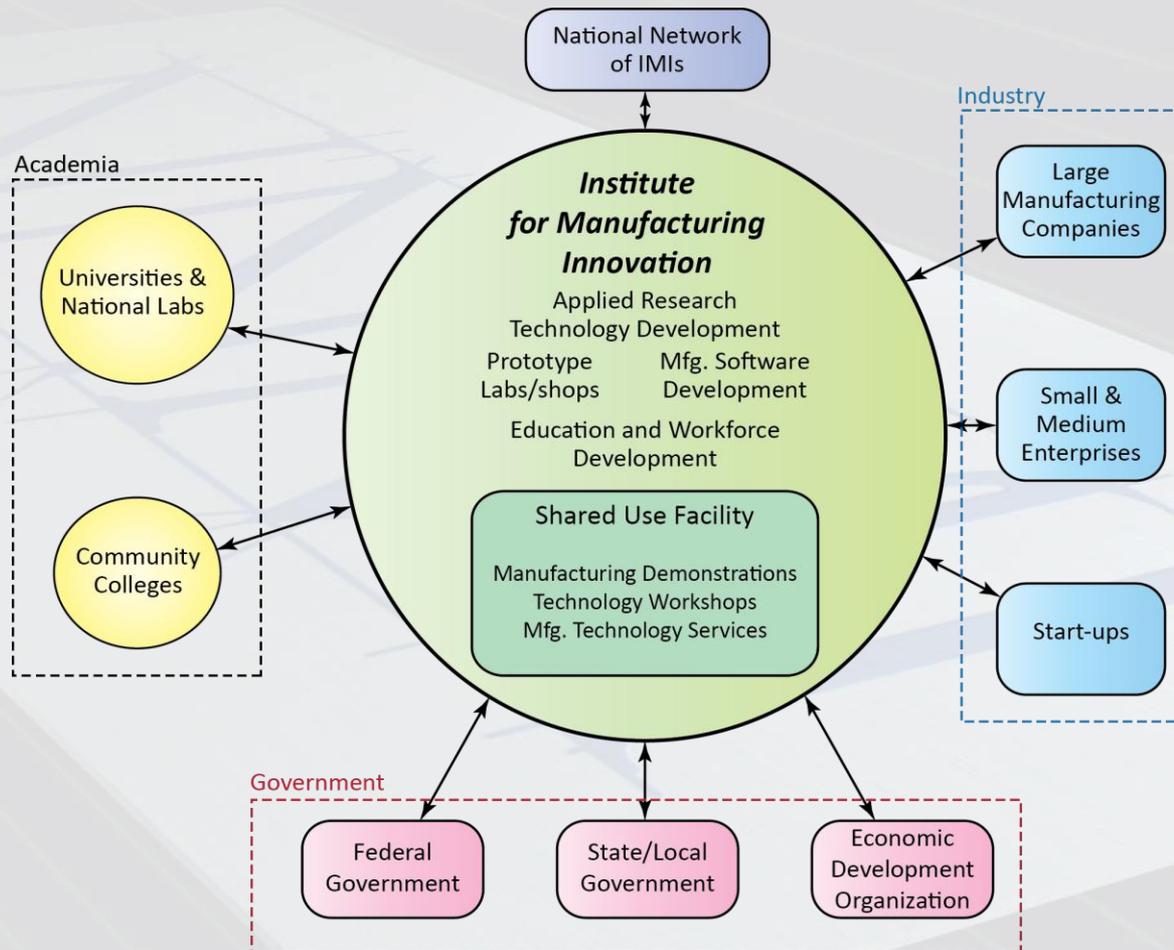


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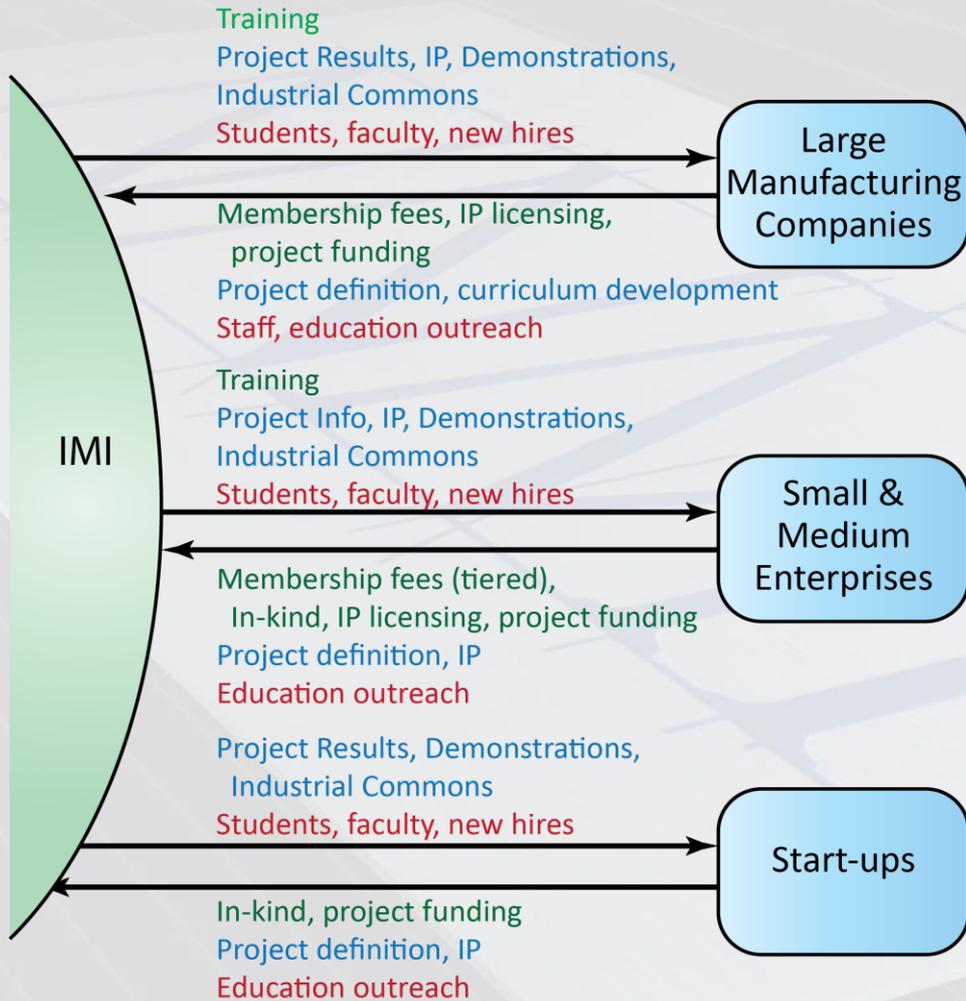
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# Institute Structure – Post RFI Vision



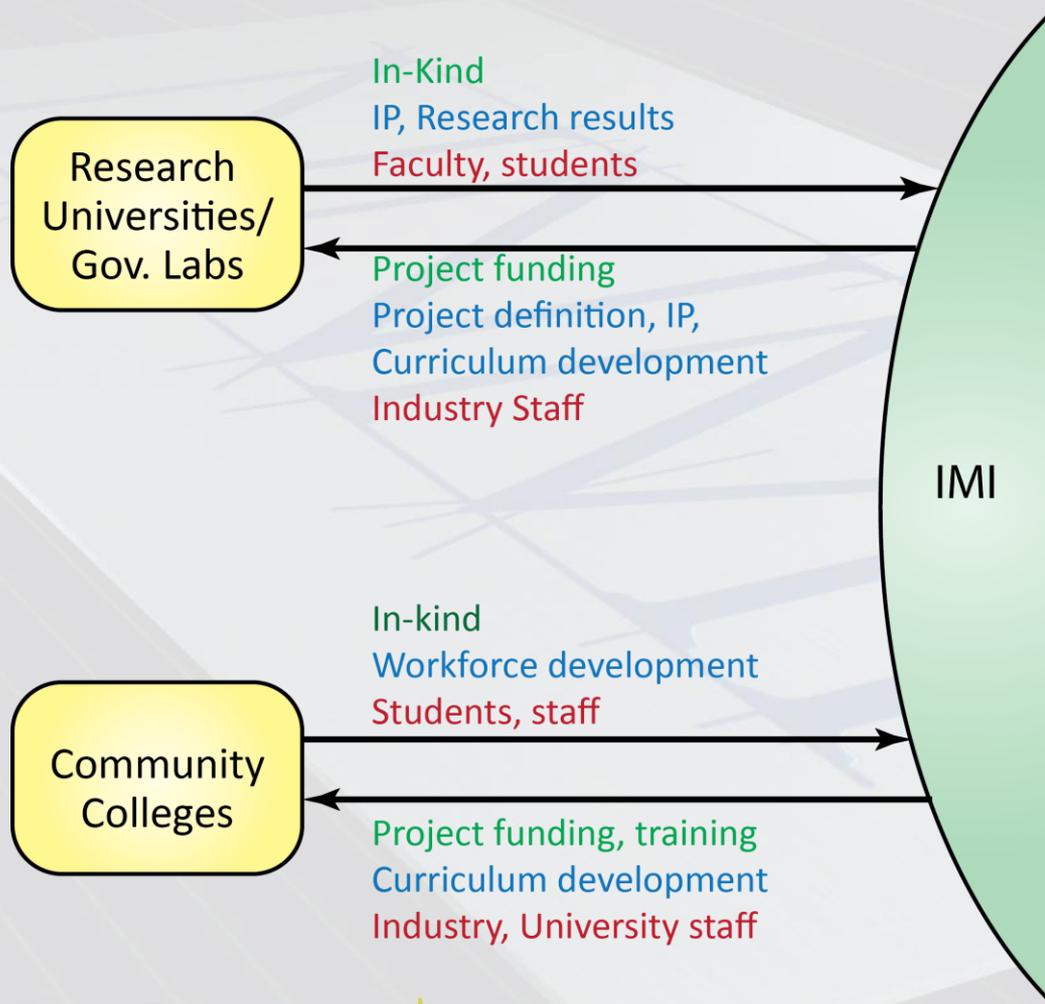
# Detail: Industry Interactions



- Interactions are through **funding (green), information (blue)** and **personnel (red)**.
- Institutes will have a low barrier to entry, and will interact with start-ups and SMEs
- Information transfer is not limited to project results; an Industrial Commons promotes cross-talk.



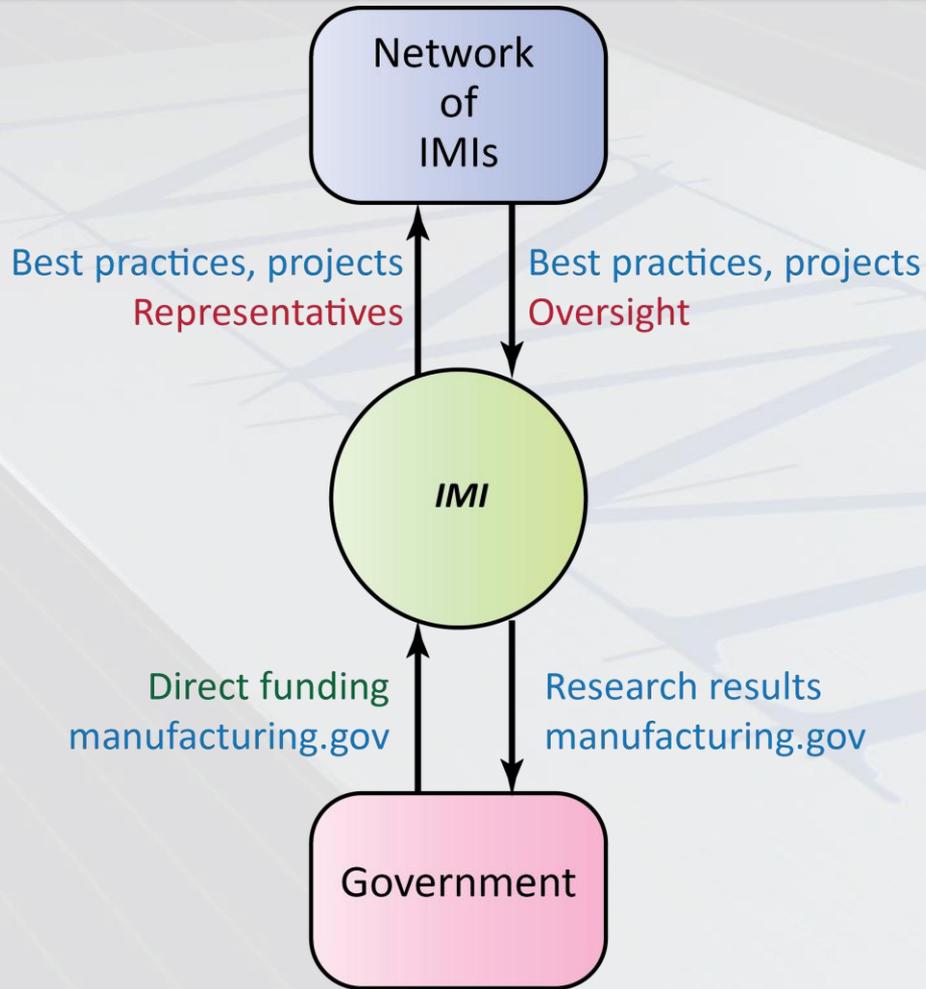
# Detail: Academia Interactions



- Interactions are through **funding (green), information (blue)** and **personnel (red)**.
- Community colleges are essential for workforce development tasks.
- Academia interactions are facilitated by the IMI.



# Detail: Other Interactions



- Each Institute will participate in the NNMI, web portal.
- Institutes will share resources.
- Institutes will direct projects to other institutes as appropriate.
- Government (federal and state) will provide funding and disseminate research results through manufacturing.gov.



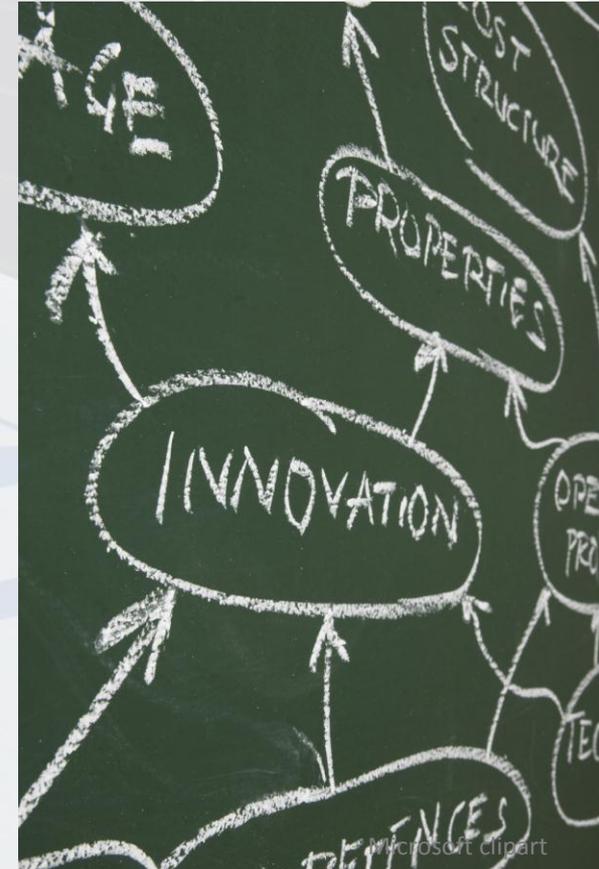
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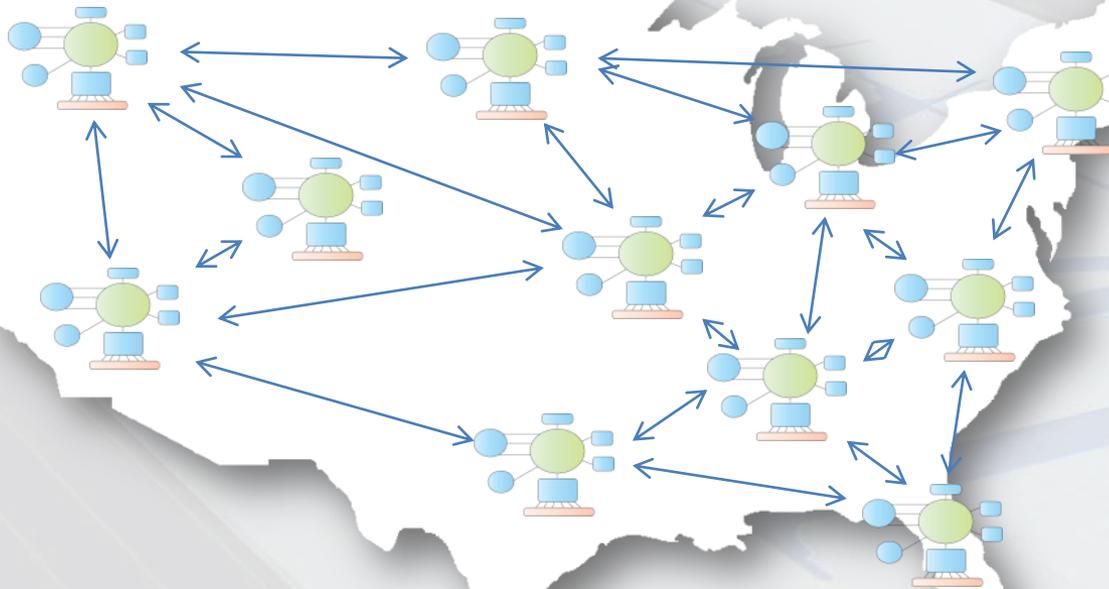


# IMI Key Characteristics

- Institutes will be the anchor to a regional innovation ecosystem, with a vision for national and international preeminence.
- Institutes will be partnerships between all stakeholders: industry, academia, government, industry development organizations.
- Each institute will have its own unique focus area, one of:
  - Manufacturing process
  - Advanced Materials
  - Enabling Technology
  - Industry Sector
- Institutes should be proposed by an industry-based non-profit organization.
- Institutes will be self-sustaining after 7 years.



# NNMI Characteristics



- Promote collaboration between institutes
- Provide a forum for sharing best practices
- Establish common IMI Policies when appropriate
- Link activities through the Manufacturing Portal



# Summary: Game Changing Characteristics

- Establish a presence, at scale, in the missing middle
- Partnering between all stakeholders
- An Industrial Commons
- Emphasizing/supporting longer-term investments by industry
- Combining R&D with workforce training
- A national network of Institutes
- Overarching mission: Create new U.S. manufacturing capabilities and industries



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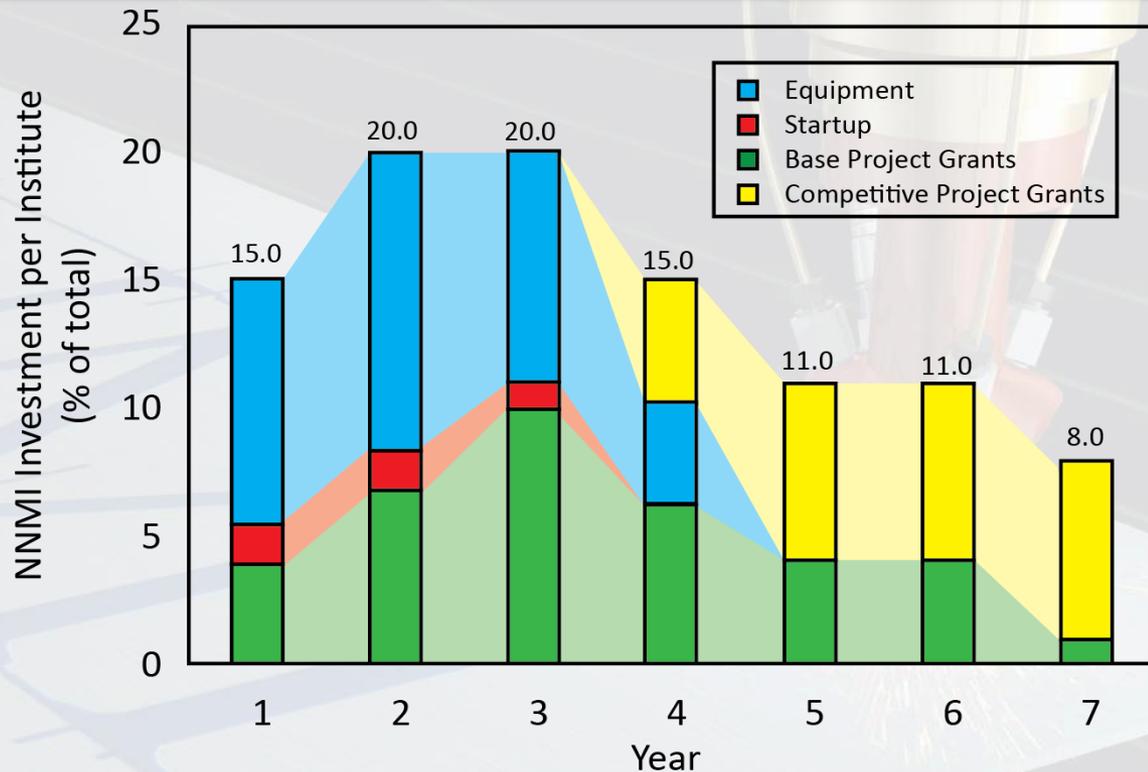


# Notional Spending Plan – Federal Funds

Federal Funds: \$70-120 million, over 5-7 years

Categories:

- Equipment, especially in first years
- Startup, administrative costs
- Base project grants, commitment with funded proposal
- Competitive project grants, allows a gate system to reward performance.

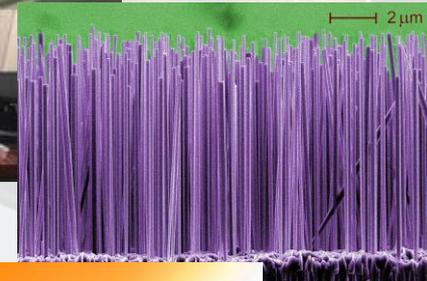


Institute investment of federal-only funds (does not illustrate matching funds or other revenue streams)



# Proposed Selection Criteria

- Technology focus
- RD&D plan
- Broad Impacts
- Partner resources
- Co- investments
- Financial Plan
- Education and Workforce Development Plan
- Adequacy of Governance and Oversight



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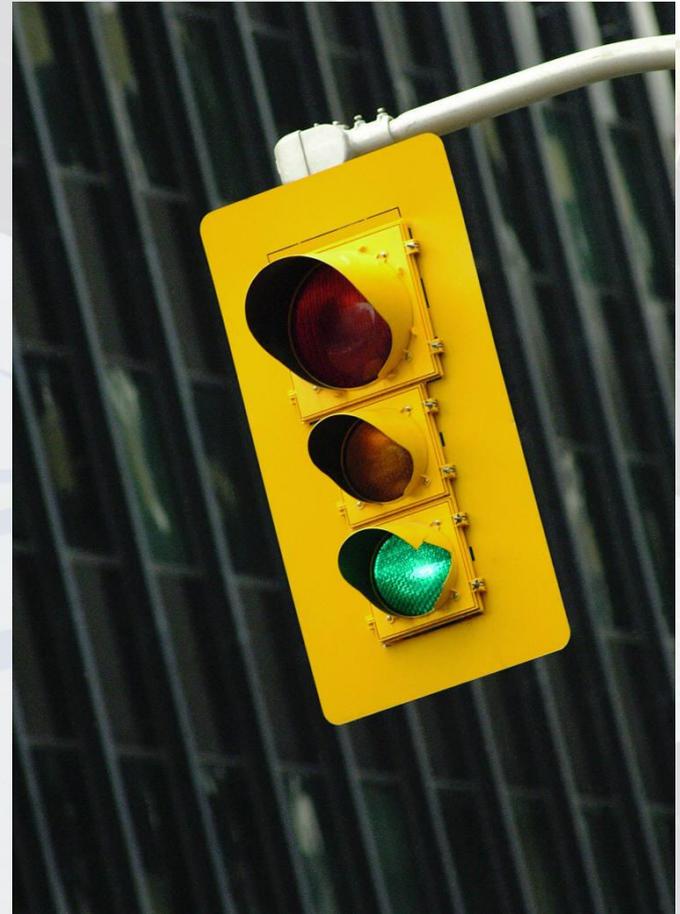
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# A Pivot Point

- The RFI period is over! This workshop transitions from public crowdsourcing to communication and design refinement
- Morning: Overview and Details of NNMI and IMIs
- Afternoon: Café sessions – feedback on design and input on implementation



# Broad Public Input

Almost 1000 voices have been heard as part of RFI process. Comments have been reviewed, analyzed, and organized by AMNPO. Consensus has been reached on most issues; some remain.

**Information was requested on four major topics:**

- **Technologies with Broad Impact**
- **Institute Structure and Governance**
- **Strategies for Sustainable Institute Operations**
- **Education and Workforce Development**



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## Workshop on the Design of the National Network for Manufacturing Innovation

### NNMI Design Characteristics

#### Technologies with Broad Impact

Scott Smith, Department of Commerce



#### Institute Structure and Governance

LaNetra Tate, NASA



#### Strategies for Sustainable Institute Operations

Adele Ratcliff, Department of Defense



#### Education and Workforce Development

Greg Henschel, Department of Education

