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**Adele Ratcliff**  
**Director, DoD Manufacturing Technology Program**

**DOE and DOD Multi-topic Workshop**  
**Fort Worth, TX**  
**October 8 and 9, 2014**



# Department of Defense led Institutes for Manufacturing Innovation

**OSD Manufacturing Technology Office**  
**October 08, 2014**



# Creating an Innovation Ecosystem



- **A CEO: “can’t predict when or where innovation happens.”**

**But – we do know key characteristics:**

- **Close proximity is key**
- **Design, make, learn cycle – must be quick**
- **Ecosystem needs all aspects of manufacturing to excel**



# The Administration's Continuing Focus on Advanced Manufacturing



January 2013



Jan 2014



Feb 2014

**June 2011**

REPORT TO THE PRESIDENT ON  
ENSURING AMERICAN  
LEADERSHIP IN ADVANCED  
MANUFACTURING

Executive Office of the President  
President's Council of Advisors  
on Science and Technology

JUNE 2011



**February 2012**

A NATIONAL STRATEGIC  
PLAN FOR ADVANCED  
MANUFACTURING

Executive Office of the President  
National Science and Technology Council

FEBRUARY 2012



**July 2012**

REPORT TO THE PRESIDENT ON  
CAPTURING DOMESTIC  
COMPETITIVE ADVANTAGE IN  
ADVANCED MANUFACTURING

Executive Office of the President  
President's Council of Advisors on  
Science and Technology

JULY 2012



**January 2013**

NATIONAL NETWORK  
FOR MANUFACTURING  
INNOVATION:  
A PRELIMINARY DESIGN

Executive Office of the President  
National Science and Technology Council  
Advanced Manufacturing National Program Office

JANUARY 2013





# Institutes for Manufacturing Innovation (IMIs)



- **Leverage effectiveness of regional, and National public-private partnerships to spur innovation and competitiveness of U.S. manufacturing**
- **Institutes form the core of the National Network for Manufacturing Innovation (NNMI); key tenets:**
  - Scale critical technologies in MRL 4-7 range
  - Run by Non-profit, Members from Industry and Universities
  - Technology Advisory Group develops roadmap; steers investments
  - Self-sustainment objective for each institute within 5-7 years
- **Administration's NNMI Vision: up to 45 Institutes**
  - Seeking Congressional authorization and funding to bring NNMI to full scale
  - Early institutes established via executive authorities, funding
  - Revitalize American Manufacturing Innovation (RAMI) bill pending in Congress



# IMIs as an Ecosystem



- **Each institute will serve as a regional hub of manufacturing excellence, to:**
  - Bring together industry, universities and community colleges, federal and state agencies, and in some cases, state/regional economic development authorities
  - Stimulate and accelerate manufacturing innovation
  - Invest in industrially relevant manufacturing technologies with broad applications
  - Bridge the gap between basic research and product development
  - Provide shared assets or knowledge to help companies – particularly small manufacturers – access cutting-edge capabilities and equipment
  - Create an unparalleled environment to educate and train students and workers in advanced manufacturing skills
  - Demonstrate regional impact and national benefits
- **Institute Tenets:**
  - Led by a non-profit or university
  - Significant Cost share (>50%)
  - Shared infrastructure, access to test bed for small and medium enterprises
  - Advanced applied research, but focused on scale-up of established R&D
  - Workforce development
  - Governance through Public Private Partnership
  - Sustainability within 5-7 years



# DoE and DoD-led Institutes



- **Established Institutes:**

- **America Makes** (Additive Manufacturing)—Established Aug 2012 DoD
- Next Gen. **Power Electronics Manuf.** Innovation Institute— Announced Jan 2014 DoE; Cooperative agreement still pending completion of negotiations
- **Digital Manufacturing & Design Innovation (DMDI)** Institute—Est. Feb 2014 DoD
- **Lightweight & Modern Metals Manufacturing Innovation (LM3I)** Institute— Est. Feb 2014 DoD

- **FY15 Institutes**

- 2 Institutes led by DoE
- 2 Institutes led by DoD



# America Makes

## America Makes – the National Additive Mfg Innovation Institute

*Prime Awardee Announced 16 Aug. 2012 in Youngstown, OH:  
National Center for Defense Mfg and Machining*

- \$50M federal investment and 1:1 cost share pledged to support development and management of the institute plus applied research projects over 5 years
- 22 research projects underway with \$13.5M federal funds plus \$15M private funds so far
- Industry entrusted 14 machines to the institute
- Strong tech transition, workforce education & STEM focus

### POCs:

- Jennifer Fielding, Government Program Manager, America Makes  
[jennifer.fielding@wpafb.af.mil](mailto:jennifer.fielding@wpafb.af.mil)
- Ed Morris, Director, America Makes  
[Ed.morris@ncdmm.org](mailto:Ed.morris@ncdmm.org)





# DMDI Institute Overview

Lead: **ULABS**

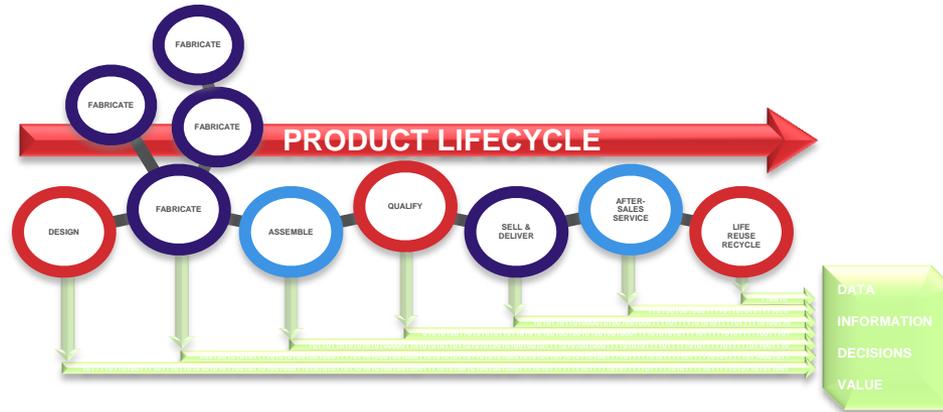
Hub location:

Chicago, Illinois

42 Companies

23 University and Labs

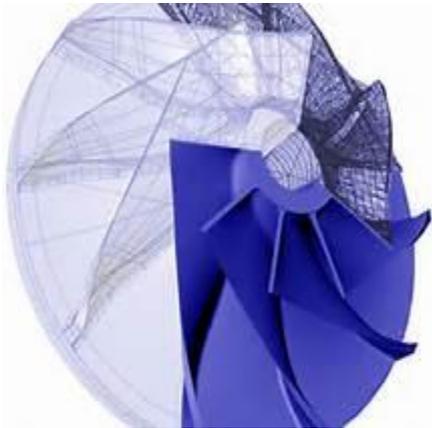
9 Other Organizations



**DATA ACROSS THE PRODUCT LIFECYCLE**



President Barack Obama announces the DMDI Institute, 25 February 2014. (Official White House Photo by Pete Souza)



***Mission:*** Establish a state-of-the-art proving ground for digital manufacturing and design that links IT tools, standards, models, sensors, controls, practices and skills, and transition these tools to the U.S. design & manufacturing industrial base for full-scale application

**Over 3:1 Industry Cost Share**



# DMDI Institute Overview



- **DMDI Institute**
  - Lead: UI LABS (hub location: Chicago, IL)
  - 42 companies, 23 universities & labs, 9 other organizations
  - Multiple states represented including IL, MO, FL, NY, OH, MD, IA, IN, CO, TX, MI, OR, MA, WA, KT, NE, WI, among others
- **Total cost share contribution: Cooperative Agreement = \$105M**
  - UI LABS announced a total of \$250M
  - Total cash contributions - \$56M
  - Total in-kind contributions - \$194M
- **Breakout by source**
  - Industry - \$80M
  - Academia - \$120M
  - State/Local Government and Other - \$50M



# Lightweight and Modern Metals Manufacturing Innovation Institute

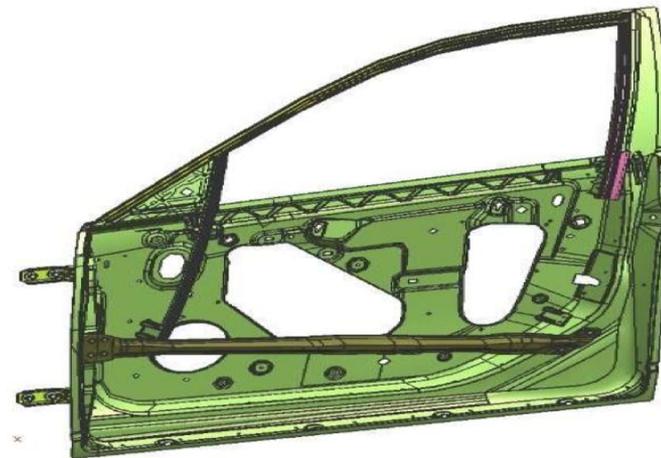


**Lead: ALMMII**

**Hub location: Detroit Metro, Michigan**

**Regional location: I-75 Corridor**

**Current number of members 76**



**Mission: Provide the National focus on expanding US competitiveness and innovation, and facilitating the transition of these capabilities and new technologies to the industrial base for full-scale application.**

***Positioned to expand the US Industrial base for new products and technologies for commercial and USG demands that utilize new, lightweight high-performing metals***



# LM3I Institute Overview



- **LM3I Institute**
  - Lead: ALMMII (hub location: Detroit)
  - 76 members comprised of universities and labs, companies, and other organizations.
  - Multiple states represented including Ohio, Michigan, Indiana, Kentucky, Tennessee, Texas, Massachusetts, Colorado, Illinois, Pennsylvania, Maryland, among others
  - Current number of members 76. Sixteen new members have been added since Feb 21 contract award
  - Lease agreement for ALMMII headquarters signed in July. ALMMII HQ Establishment in Detroit “Corktown”
  - HQ ribbon cutting ceremony to be conducted November 2014.
- **Total cost share contribution: \$78M**
  - Total cash contributions - \$25M
  - Total in-kind contributions - \$53M
    - Received first funds from City of Detroit grant through their New Economy Initiative - \$1M
- **Breakout by source**
  - Industry - \$30M Academia - \$22M State/Local Gov. and Other - \$26M



# Institutes for Manufacturing Innovation DoD FY15 Institutes 4 and 5



## ★ **General:**

- ★ DoD establishing Institutes - on behalf of whole-of-Government
- ★ Regionally centered - but with national impact
- ★ At least \$75M federal funding per institute
- ★ Minimum 1:1 cost share
- ★ Self-sustaining in 5 years, option to 7 years
- ★ DoD identified technology areas with interagency interest:
  - ★ DoD #4: Integrated Photonics Manufacturing
  - ★ DoD #5: RFI closes 10 Oct

## ★ **Scope:**

- ★ Advanced manufacturing research
- ★ STEM initiatives
- ★ Shared assets and knowledge
- ★ Workforce development



# DoD-led Institutes FY15 Acquisition Process Timeline



- **Incorporate key lessons learned from previous institute cycles**
- **Identify lead service for each institute**
- **Assemble technical teams**
- **Issue RFI**
  - Gauge Industry interests
  - Narrow focus for BAA
- **Acquisition strategy to support cooperative agreement**
  - 2-Step BAA
  - Industry Day
- **Engaging inter-agency partners**
- **Identifying DoD SMEs to support DoE-led institute**
- **Anticipated BAA release dates: Nov 2014 – Jan 2015\***
- **Anticipated award dates: early / late summer 2015\***

*\* Dependent on Institute 5 topic down-select timeframes*



# DoD FY15 Institutes 4 & 5



- **Topic selection underway**
  - Multi-topic RFI is issued to inform final decision. Top 6 topics:
    - *Engineered Nano Materials*
    - *Photonics DoD IMI #4 (NOI published 30Oct)*
    - *Aerospace Composites*
    - *Fiber and Textiles*
    - *Flexible Hybrid Electronics*
    - *Electronic Packaging And Reliability*
  - Anticipate awards in *Spring/Summer 2015*



# Backup



# America Makes 116 Member Organizations (as of 9/26/2014)

## 3D Systems Corporation\*

3M  
Advance Methods in Innovation  
Alcoa  
Allegheny Technologies Incorporated\*  
Applied Optimization Inc.  
Applied Systems and Technology Transfer (AST2)\*  
Arkema, Inc.  
ASM International  
Association of Manufacturing Technology\*  
Binghamton University  
Bayer Material Science\*  
The Boeing Company  
Carnegie Mellon University\*  
Case Western Reserve University\*  
Catalyst Connection\*  
Concurrent Technologies Corporation\*  
Connecticut Center for Advanced Technology, Inc.  
Deformation Control Technology, Inc.  
Deloitte Consulting, LLC  
DSM Functional Materials  
DVIRC  
Energy Industries of Ohio\*  
EWI  
The ExOne Company\*  
General Electric Company (GE)\*  
General Dynamics, Global Imaging Technologies  
Greenleaf Corporation  
Hoeganaes Corporation  
Illinois Tool Works, Inc.  
Jabil Circuit, Inc.  
Johnson Controls, Inc.\*  
Kennametal\*  
Lawrence Livermore National Laboratory

Lehigh University\*  
The Lincoln Electric Company  
Lockheed Martin\*  
Lorain County Community College  
Louisiana State University  
M-7 Technologies\*  
MAGNET\*  
Materials Sciences Corporation  
Materion Corporation  
MAYA Design Inc.  
Met-L-Flo  
Michigan Technological University  
Milwaukee School of Engineering  
Missouri University of S&T  
MIT Lincoln Laboratory  
NNSA's National Security Campus  
NorTech\*  
North Carolina State University  
Northern Illinois Research Foundation  
Northrop Grumman\*  
Oak Ridge National Laboratory  
Ohio Aerospace Institute\*  
Optomec\*  
Oxford Performance Materials\*  
Pennsylvania State University\*  
PTC ALLIANCE  
Raytheon Company\*  
Rhinestahl Corporation  
Robert C. Byrd Institute (RCBI)\*  
Robert Morris University\*  
Rolls-Royce Corporation  
RP+M  
RTI International Metals, Inc. \*  
SABIC Innovative Plastics Business  
Sandia National Laboratories

Sciaky, Inc.  
SME\*  
Solid Concepts  
South Dakota School of Mines & Technology  
Stony Creek Labs  
Stratasys, Inc.  
Strategic Marketing Innovations, Inc.  
Stratronics\*  
TechSolve\*  
Texas A&M University  
The Timken Company\*  
Tobyhanna Army Depot  
United Technologies Corporation  
University of Akron\*  
University of California, Irvine  
University of Connecticut  
University of Dayton Research Institute  
University of Louisville  
University of Maryland – College Park  
University of Michigan Library  
University of Notre Dame  
University of Pittsburgh\*  
University of Tennessee, Knoxville  
University of Texas – Austin  
University of Texas at El Paso  
USA Science and Engineering Festival  
Venture Plastics, Inc.  
Westmoreland County Community College\*  
West Virginia University  
Wohlers Associates, Inc.\*  
Wolf Robotics  
Wright State University  
Youngstown Business Incubator\*  
Youngstown State University\*  
Zimmer, Inc.

Platinum Members (\$200K) = RED; Gold Members (\$50K) = BLUE; Silver Members (\$15K) = BLACK (\$15K); \* Original Members (38)



# America Makes Memberships Locations by State (as of 9/24/2014)



As of 9/24/2014:  
 116 Members  
 44 States  
 7 Major Defense Contractors  
 7 Equipment Suppliers  
 28 Large Businesses (LAR)  
 25 Small & Medium Businesses (SME)  
 63 Universities/Colleges/Labs/Non-Profits

**NOTE: Membership Map is based on multiple locations for many of the members**

Community    EDU    GOV    LAR    ORG    SME



# DMDI Institute Member Locations

