

Manufacturing USA[®]



Electronics

Materials

Energy/ Environment

Digital / Automation

Bio- Manufacturing



Integrated
Photonics
Albany, NY
Rochester, NY



Advanced Fibers
and Textiles
Cambridge, MA



Modular
Chemical Process
Intensification
New York, NY



Additive
Manufacturing
Youngstown, OH
El Paso, TX



Regenerative
Manufacturing
Manchester, NH



Flexible Hybrid
Electronics
San Jose, CA



Advanced
Composites
Knoxville, TN
Detroit, MI



Sustainable
Manufacturing
Rochester, NY



ARM

Advanced
Robotics
Pittsburgh, PA



Biopharmaceutical
Manufacturing
Newark, DE



Wide Bandgap
Semiconductors
Raleigh, NC



Lightweight
Materials
Detroit, MI



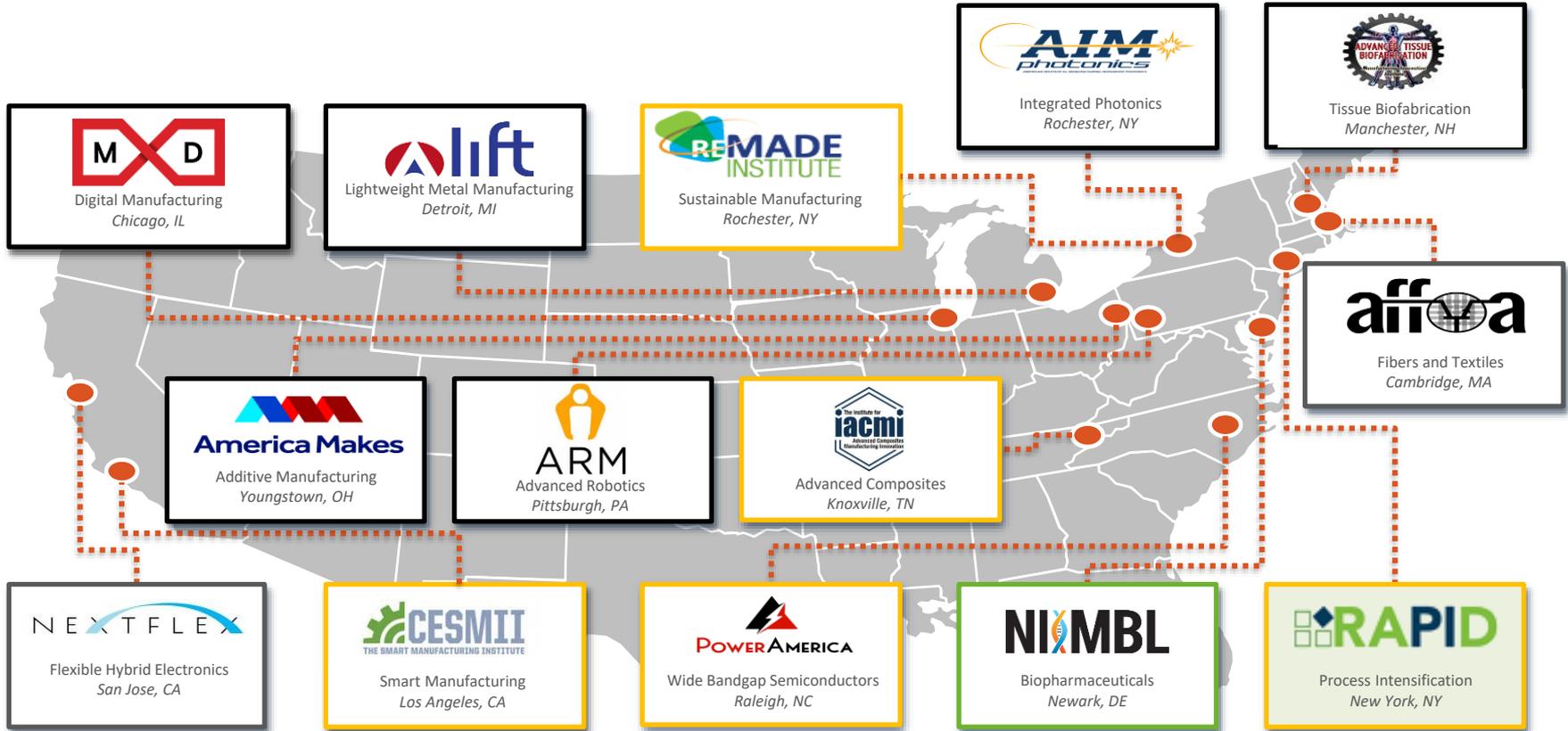
Smart Sensors
and Digital
Process Control
Los Angeles, CA



Digital
Manufacturing
Chicago, IL

- Public-private partnership model to drive U.S. advanced manufacturing competitiveness
- Brings \$1B (federal) and over \$2B (private) to R&D, tech demonstration, and education
- Innovating new ways to manufacture in the U.S.
- Developing the next generation workforce

Manufacturing USA[®]



Digital Manufacturing
Chicago, IL

Lightweight Metal Manufacturing
Detroit, MI

Sustainable Manufacturing
Rochester, NY

Integrated Photonics
Rochester, NY

Tissue Biofabrication
Manchester, NH

Additive Manufacturing
Youngstown, OH

Advanced Robotics
Pittsburgh, PA

Advanced Composites
Knoxville, TN

Fibers and Textiles
Cambridge, MA

Flexible Hybrid Electronics
San Jose, CA

Smart Manufacturing
Los Angeles, CA

Wide Bandgap Semiconductors
Raleigh, NC

Biopharmaceuticals
Newark, DE

Process Intensification
New York, NY



Transforming the Process Industries Through Modular Chemical Process Intensification

Bill Grieco (CEO)
RAPID Manufacturing Institute
willg@aiche.org



A public-private partnership
between DOE and AICHE.



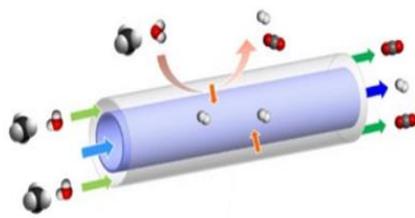
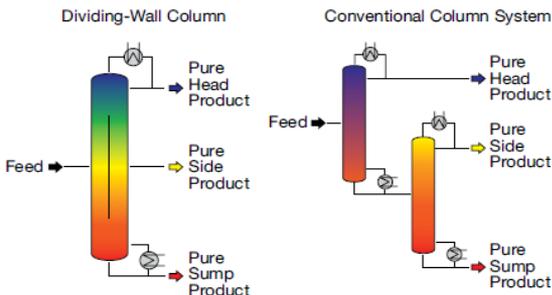
What Is Modular Process Chemical Intensification?

Process Intensification

- Transition from pure unit operations thinking to more integrative approach
- Paradigm shift in process design and process development that leads to substantially smaller, cleaner and more energy efficient processes

Modular Processing

- Novel designs to bring distributed manufacturing to the process industries
- Factory fabrication of process equipment that reduces costs and allows scaling in number rather than volume

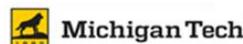




RAPID

Transforming Process Industries

The RAPID Member Community



- **Community and Thought Leadership**

- 77 active members
- Online member directory
- Virtual technology showcases
- Roadmaps and problem discover workshops

- **Projects**

- 33 current projects across 6 focus areas
- Early stage R&D to proof-of-concept demos
- \$118M committed (1/3 federal, 2/3 private)

- **Education**

- Over 750 people trained to-date
- 14 webinars launched to-date, 3 more in 2019
- Structured internship program for members
- *Fundamentals of PI* eLearning course available, five more coming



- Community Engagement
 - Collaboration with members
 - **Visibility via meetings and Technology Showcase events**
- Projects
 - Opportunity to participate in R&D projects
 - **Strong need for equipment and fabrication partners**
 - Flexible IP arrangements
- Education & Workforce Development
 - Full access to RAPID eLearning and webinar content
 - **Intern management and training programs**