



REVOLUTIONIZING MODERN MANUFACTURING

The impact of MED on Manufacturing USA.

BY MIKE MOLNAR, FORMER MANUFACTURING ENGINEERING DIVISION CHAIR (2007-2008)

As the ASME Manufacturing Engineering Division (MED) celebrates a century of contributions to manufacturing innovation and our profession, it is a great pleasure to be part of this five-part series on how these activities have influenced the world today. This is the story of the considerable contributions that ASME and the MED have made in establishing Manufacturing USA—a national initiative to secure U.S. global leadership in advanced manufacturing.

Manufacturing USA consists of a network of public-private partnerships, where nine federal agencies and now 15 national innovation institutes collaborate with industry, academia, and local organizations by a “whole-of-government” approach toward the development of innovative advanced manufacturing technologies. The agencies establish and support institutes aligned with national

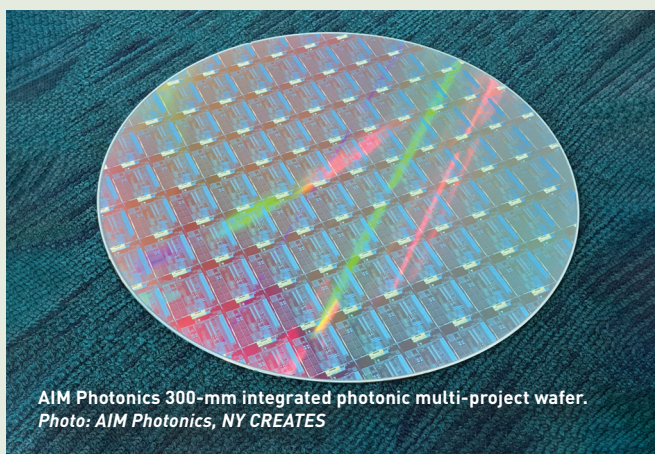
priorities, with a common foundational structure built upon the needs of industry in accelerating transformational manufacturing technologies.

Operating under the overarching Manufacturing USA network, the members within each of the institutes collectively engage in the development of pre-competitive technologies within their specific field of focus through the co-investment in emerging innovations, shared use of capital-intensive infrastructure, and development of a workforce with the skills needed for today’s manufacturing.

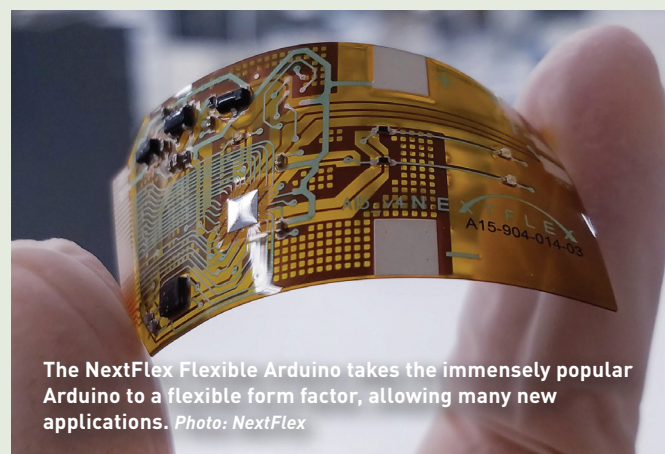
The institutes are about collaboration—to speed up and reduce risk on game-changing advanced manufacturing technologies. At its simplest, manufacturing technology hinges on ideas and people, the twin pillars of technology development—people develop, promote, manage, and implement new tech-

nologies. So how does a century of MED relate to a relatively new program, established by Congress in December 2014? The answer lies in the collaborative and constructive nature of engineering, and the women and men of ASME who made it possible.

New technology is not created in a vacuum—it is built on an ever-growing body of scientific and engineering knowledge. Consider the rapid developments at America Makes, the Manufacturing USA institute on additive manufacturing. Additive manufacturing to many may seem like a new technology arising just a few years ago, yet this is a story that began with manufacturing process development some 40 years ago. That innovation in turn rests on many other technologies, such as numerically controlled machine tools originally developed in the 1950s.



AIM Photonics 300-mm integrated photonic multi-project wafer. Photo: AIM Photonics, NY CREATES



The NextFlex Flexible Arduino takes the immensely popular Arduino to a flexible form factor, allowing many new applications. Photo: NextFlex

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We have always “stood on the shoulders of giants” in engineering; the difference today is the speed of innovation and the convergence of multidisciplinary areas in systems design. The fruits of ASME conferences and publications over the past century are benefitting every Manufacturing USA institute today.

Public policy is a political process requiring public input, deliberation, and debate. Moreover, today many—if not most—policy issues involve technology. In the public policy arena scientists and engineers are a considerably rare breed. In today’s complex world, sound and effective public policy requires accurate technical information.

Policies involving complicated technologies and commercial ecosystems require subject matter experts from industry and academia. This is where ASME has made notable contributions and impact, and the ASME Roy V. Wright public policy award was established to honor this notion. Wright, President of the Society in 1931, believed in the role of engineers as important contributors to our nation. The Wright spirit is about good citizenship informing public policy. ASME has contributed to the development of public policy through various activities that include the annual Engineering Public Policy Symposia on Capitol Hill along with many Congressional briefings and expositions.

Manufacturing USA greatly benefitted from this active participation by ASME in connecting the voice of industry and

“Technology hinges on ideas and people, building upon past discoveries for tomorrow’s innovations.”

academia to establish the Manufacturing USA institute design framework. Engineering is a team sport, with the best designs developed by a rich, diverse development process. Working as an interagency team including the Departments of Commerce, Defense, Education, Energy, and Labor along with NASA and NSF, a public “Request for Information” was released in 2012 with 21 key questions about how the manufacturing innovation institutes should be structured and function. Five large regional workshops were held around the nation with facilitated working sessions. In total we attracted over 1,200 contributors from industry and academia.

The institute framework design was published as a National Science and Technology Council (NSTC) report in 2013. It is a rare NSTC report to have more than a few authors. The Manufacturing USA design report lists 845 authors, every person involved who wanted to be identified publicly as a contributor.

Engineering public policy and public-private partnerships such as Manufacturing USA all require soundly developed plans and expert reports—the critical resource to implementation is talented and dedicated people. Manufacturing USA benefitted from the best subject matter experts in government with input from outstanding leaders from the private sector. Here is where the ASME Federal Fellows program played a seminal role. For over 45 years the ASME Federal Fellows program has been a conduit to allow experts to serve as fellows in Congress and the Executive branch to inform policy decisions.

Leveraging this pathway, ASME MED members have effectively “joined the team” in the design and implementation of Manufacturing USA as executive branch federal fellows. Who were those federal fellows who helped make Manufacturing USA what it is today? Tom Kurfess (Georgia Tech), Steven Schmid (Notre Dame), Scott Smith (UNC Charlotte), Brad Kinsey (UNH), Brian Paul (Oregon State), Gloria Wiens (Florida), Shreyes Melkote (Georgia Tech), Frank Pfefferkorn (Wisconsin), Z.J. Pei (Texas A&M), Albert Shih (Michigan), Yuebin Guo (Rutgers), Kevin Chou (Louisville), Hong Liang (Texas A&M), and John Roth (Penn State). All of these leaders are preeminent experts who contributed their experience toward sound public policy, and all share the ASME MED connection.

It was a tremendous opportunity for me to take a public service leave from my industry career in 2003-2004 to serve as the first ASME manufacturing policy fellow at the White House Office of Science and Technology Policy. When the public and private sectors increasingly collaborate on manufacturing innovation, the impact extends beyond the people involved to communities and the entire nation for many years to come. **ME**

MIKE MOLNAR is the founding director of the Advanced Manufacturing National Program Office, the interagency team responsible for Manufacturing USA. He is an active Life Fellow member of ASME and has held over 50 significant leadership positions, including his current role serving as an ASME governor-at-large.



The group lunch for the Manufacturing USA “Designing for Action” Workshop on January 16, 2013, was held under a Saturn V Rocket.

Photo: U.S. Space & Rocket Center, Huntsville Alabama