Strategic approach to materials research aims to benefit US manufacturers

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Innovative new materials drive advances in virtually every product and industry imaginable—healthcare, transportation, energy, electronics, and many others.

Yet it takes nearly two decades from the time researchers develop a new material until that material actually makes its way into manufactured products. That long lag is a major barrier in U.S. manufacturers' efforts to remain competitive in an intense global market—and strengthening the nation's manufacturing sector is among U.S. President Barack Obama's top priorities.

Through the Materials Genome Initiative for Global Competitiveness, a plan launched in 2011 under the U.S. Advanced Manufacturing Partnership, the federal government aims to double the pace of advanced materials discovery, innovation, manufacture and commercialization. "We believe that manufacturing is a gateway for further economic growth to improve our middle class," says Cyrus Wadia, White House Office of Science and Technology Policy assistant director for clean energy and materials R&D. "We want to focus heavily not on what manufacturing used to look like, but what manufacturing will look like. The Materials Genome Initiative was designed to put us at the frontier of this intersection between materials and manufacturing."

Now, as the initiative marks its third year, experts at three leading universities are partnering on a unique effort to create synergy among the nation's materials researchers.

The MGI Accelerator Network unites a team of leading MGI researchers at the Georgia Institute of Technology, the University of Michigan and the University of Wisconsin-Madison.

One of the team's aims is to identify strategic ways in which researchers across the country might share resources, knowledge and expertise to develop new materials quickly and efficiently. "A central goal is to integrate and accelerate MGI research activities going on across the United States," says David McDowell, the Regents Professor and Carter N. Paden Jr. distinguished chair in metals processing at Georgia Tech.

To improve understanding of MGI challenges and to help focus MGI-related research—which centers around building an innovation infrastructure of integrated experiments, computation and digital data—members of the Accelerator Network are engaging thought leaders and stakeholders from academia, industry and governmental agencies in the United States. On June 5 and 6, 2014, the team hosted a workshop at Georgia Tech that drew more than 150 of these representatives, as well as speakers who are leading MGI efforts within U.S. industry, academia and government.

One of the outcomes of the workshop was a series of priorities that include developing an inventory of MGI-related research and infrastructure. "We want to get the most value out of what research is being planned and conducted," says John Allison, a professor of materials science and engineering at the University of Michigan. "A comprehensive picture of these efforts, as well as the physical and cyber infrastructure that exists around the country, will allow materials researchers to form collaborations, identify fundamental engineering problems, share best practices and novel approaches, and to support interdisciplinary communication among industry, academia and government laboratories, and across geographical boundaries."

This integrated approach also will allow researchers work in partnership with manufacturers to understand their challenges and develop materials that meet their needs. "It may be a cliché, but we believe that the whole can be much greater than the sum of the parts," says Thomas Kuech, the Milton J. and A. Maude Shoemaker and Beckwith-Bascom Professor of chemical and biological engineering at UW-Madison. "Creating a culture and an infrastructure in which these partnerships are facilitated and flourish will lead to new, application-specific materials in much shorter time frames. Ultimately, U.S. manufacturers benefit from reduced costs, improved quality, and much faster product development."

Provided by University of Wisconsin-Madison