From: Corey Schenck [mailto:cschenck@MIT.EDU]
Sent: Monday, September 19, 2011 3:46 PM
To: amtech
Cc: Claude R Canizares
Subject: AMTech Comments

Dear AMTechRFC@nist.gov:

Please find attached comments in response to the NIST Request for Information on How To Structure Proposed New Program: Advanced Manufacturing Technology Consortia (AMTech). As detailed in the attached letter, please direct any further questions to Elizabeth B. Reynolds (lbr@mit.edu), Executive Director of MIT's Industrial Performance Center, Sanjay E. Sarma (sesarma@mit.edu), Professor of Mechanical Engineering, or William B. Bonvillian (bonvill@mit.edu), Director of the MIT Washington Office.

Thank you,

Corey

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September 19, 2011

To: Dr. Patrick D. Gallagher
Undersecretary of Commerce for Standards and Technology and
Director of NIST
Through: AMTechRFC@nist.gov

MIT Response to NIST Request for Information on Structure for Proposed Advanced Manufacturing Technology Consortia (AMTech) Program

We are pleased to respond to NIST's request for information regarding its proposed Advanced Manufacturing Technology Consortia (AMTech) program. We believe this proposal offers an important potential contribution to our manufacturing sector; the concept of this program is novel and will fill a gap that currently exists with respect to developing new manufacturing technologies through collaborations between academia, industry and government. Below we provide a brief response to the AMtech program proposal, as described at http://www.nist.gov/director/amtech-072211.cfm and at http://www.gpo.gov/fdsys/pkg/FR-2011-07-22/pdf/2011-18580.pdf.

1. **Governance**
   While the AMTech program is envisioned as an industry-led initiative, we believe that this model could prove to be problematic in some circumstances and suggest that NIST explicitly allow a range of governance models. Strong industry participation is critical to the success of these consortia, however if these efforts are largely controlled by private sector leaders, there is, of course, a risk that the initiative will ultimately be oriented to serve the interests of individual companies, particularly those with scale and resources. Industry leaders play important roles nationally and regionally on a range of issues such as economic development, education and

competitiveness. But in the case of the development of new technologies that can provide direct benefits to individual companies, private sector leadership could create complex potential conflicts of interest. This is less of a concern where well-established industry consortia are already in place with a history of cross-company collaboration, but the effort to stand up new manufacturing technology paradigms may not necessarily connect with established consortia, it may well require new ones. We therefore think that NIST should allow a range of governance models. We believe a true collaboration may be the best governance approach, with leadership shared potentially between academic, non-profit and quasi-government entities along with strong industry representation (potentially as part of an executive committee structure). Industry is likely to be interested in participating in the consortia regardless of whether it shares leadership of the effort because of the access to novel research, a collaborative environment and potential commercial opportunities.

There is a second reason for a shared leadership model. The technology strands (and some of the components of those strands) that AMTech consortia could take up will be at varying distances from implementation and commercialization. While industry may be ready to support near-term technologies, it may be less willing to support elements that are further out. A shared governance model may be better suited to managing the varying ranges of the technologies NIST hopes its consortia will take up.

2. Research, Development, Scale and Shared Facilities

As envisioned, AMTech focuses on "technology push", that is, on developing technology roadmaps of critical long-term industrial manufacturing research needs and providing awards to researchers to develop the technologies to meet these needs. However, it is our experience at MIT that while the development of new technologies may begin in an academic or government lab, their ultimate success depends on the ability to scale these technologies for commercial use. Thus, research and development (R&D) must be accompanied by scale (S) at the early phases of development. The AMTech program should encompass not only the support of basic research into new manufacturing technologies, but the initial technology transfer and commercialization phases as well. In order to facilitate the initial scale up process, AMTech should ensure that its funding includes consideration and development work that encompasses the S stage.

In addition, as NIST understands well, the small and mid-sized manufacturers that constitute bulk of the U.S. manufacturing sector, are often thinly capitalized, must be risk adverse, and can rarely undertake R&D on their own. This is a structural market failure in this manufacturing innovation system that we need to recognize. For such firms to adopt new higher productivity manufacturing technologies and related processes, the costs, efficiencies, and savings of these technologies must be fully proven.

Therefore, to reach the S stage, a demonstration and testing phase must be completed. NIST should consider in its AMTech initiative, funding support for such test-bed activity, which could be cost-shared with industry and state or local government, ensuring that resources may be available to create shared facilities and equipment.

3. **Technology**

With respect to the type of technology(ies) the AMTech Consortia will support, we strongly believe that consortia should not focus on one single, narrow technology or application but a core component technology (or related group of technologies) that can be applied widely. For example, chemical processing, cell-based biomanufacturing, layered manufacturing, "network centric" manufacturing, nano-fabrication, and robotics each provide a common platform that can be applied broadly. Such a model creates opportunities for the cross-fertilization of ideas, and could enable entry into a range of industrial sectors in a regional economy.

4. **Regional Capacity Building**

Many regions have the critical inputs needed to develop new manufacturing technologies (academic research, industry expertise, financing, talent -- examples of such initiatives from the Massachusetts region include clean energy and biopharmaceutical manufacturing), but lack the coordinating mechanism as well as resources to bring these together around the challenging task of developing and nurturing emerging technologies. While there are several examples of successful state-level "cluster" initiatives, few of these are in a position to drive the development of new technologies because of the complexity and scale of the effort, which is beyond the depth of resources available at the state level. AMTech is novel in that it provides the mechanism and resources for building upon regional assets and organizing them around emerging technologies. In order to create a sustainable model that reinforces and supports the qualities of a "learning region", AMTech should include ways to engage state and other regional economic development organizations such that they are stakeholders in the consortia. These entities can act not only as partners in the initiative in the short and long term, but also build institutional knowledge and capacity to transfer the learning from the AMTech effort to other opportunities within the region. Partnership could come in the form of matching funds or in-kind contributions such as providing space and facilities to the consortia. As part of that involvement, AMTech should include an effort to build regional manufacturing strategies, connecting the AMTech consortia with state economic development entities. These strategies should consider scaling pathways for the technologies the consortia nurture and place them in the context of larger manufacturing initiatives and efforts.

If you have follow-up questions we can assist with, please don't hesitate to contact Elizabeth B. Reynolds, Executive Director of MIT's Industrial Performance Center, lbr@mit.edu, and Professor of Mechanical Engineering Sanjay E. Sarma, sesarma@mit.edu, who have aided in the preparation of these comments. The MIT Washington Office, through William B. Bonvillian bonvill@mit.edu also stands ready to assist in making connections to MIT on these issues.

Sincerely,

Claude R. Canizares
Vice President and Associate Provost for Research
Massachusetts Institute of Technology