



“Innovation in Precision Manufacturing: New Technologies to New Business”

University of Massachusetts Amherst

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Key Attributes of our Innovation Ecosystem:

Questioning & Curiosity:

Questioning and curiosity are two of the prime drivers behind Science and Technology discovery. These drivers, coupled with the need to understand basic and fundamental principles, lead to innovation and new ideas. Application of these principles and innovative ideas requires reduction to practice with collaborators with the capabilities and willingness and to invest in these technologies. Finding the link between University science and technology and local company interest hinges mainly on 'awareness'.

Risk Taking:

Many SMEs are willing to take 'calculated' risks, but still within their comfort zone. Expansions into new products or markets is difficult mainly due to (1) current business takes priority and (2) personnel resources. Some SMEs see the University as a place for new ideas and technology that can improve and expand their existing business, and willing to commit the time and resources to explore these new areas.

Openness:

Once initiated, participants from both the University and SMEs are very willing to share possibilities, visit facilities and seek additional collaborators if necessary. One hurdle is the initial introduction and identifying the right fit between the business and the technology. On occasion, it was necessary to introduce 'non-disclosure agreements' to protect potential intellectual property, but the discussions leading and following these agreements were very productive.

Collaboration Across Fields:

This program focuses on collaborations between faculty in two academic departments and area precision machining companies. Thus far, there has been a very strong collaborative effort among all participants. The partners in the program see any success as positive to the entire program. This extends beyond the University and SMEs to the other regional partners involved in the program.

Placing Partners in “New Environments” & “Playgrounds”:

Academia and industry are two different worlds, with unique cultures and motivations. These partners are intrigued with the other's capabilities and there is a willingness to work together on problems of practical and intellectual interest. Once initial barriers are overcome, the cultural divide quickly diminishes. Visits to each others facilities by SME principals and University researchers are becoming more common.

Leading/Inspiring for Surprising or Unexpected Results

Although the program is still in an early, formative stage, there have been some surprising and unexpected developments, such as the number of projects quickly identified. There also have also been some intriguing side developments including SME interactions with our School of Management on collaborative networks and growing interest in publicly funded programs to support technology R&D (SBIRs, STTRs, GOALI, etc.).

Brief Project Overview:

This PFI program is designed to enable UMass to develop working relationships with local small and mid-sized enterprises (SMEs). This program will focus on translation of new technologies from two academic departments to SMEs in the precision manufacturing sector. A major outcome of the program will be to enable regional SMEs to grow by creating new products, new jobs and opening new markets. This program will allow us to better understand the dynamics between a large research university and SMEs as they translate new technologies to new business.

Objectives:

- 1) Transfer knowledge through targeted research projects;
- 2) Provide access to UMass facilities and expertise;
- 3) Develop educational components for SMEs, and
- 4) Investigate /understand the dynamics of this regional collaboration



PFI Stakeholders: Memorandum of Agreement signing among academic, state, local agencies and local industries.

Program Activities:

6 PFI Project Teams Established:

- PFI-1 Opportunity and Challenges for Total Knee and Hip Replacement
- PFI-2 Pre-stressed Transparent Composite Systems for Impact Resistance
- PFI-3 Cryogenic Machining of Metal Alloys
- PFI-4 Roll to Roll Embossing of Micro and Nano Features on Polymeric Films
- PFI-5 Metal-Polymer Interface Studies - Thermal Spray Coating of Polymers
- PFI-6 Telescoping Mast Product Design



PFI - 1: Medical Devices



PFI - 3 : Cryogenic Machining Project

Additional Activities:

- SBIR/STTR Workshop for local industry – Oct 2009
- Memorandum of Agreement signed – Dec 2009
- Forum with the School of Management – Feb 2010
- GOALI proposal (PFI-3) submitted to the NSF – Feb 2010
- Education Programs - agencies and colleges – Mar 2010
- PFI-7 and 'Collaborative Networks' projects in development

Funding Sources to date:

- NSF Partnerships for Innovation program
- Regional Employment Board of Hampden County via award from John Adam Innovation Institute (MA state funding)
- Office of the Vice Chancellor for Research and Engagement (UMass)
- U.S. Government Funding
- Direct funding and 'In-kind' support from local SMEs

Partners:

University of Massachusetts Amherst
Polymer Science and Engineering
Mechanical and Industrial Engineering

Local Agencies and Community Colleges:

- Regional Technology Corporation
- The Regional Employment Board of Hampden County
- Holyoke Community College
- Springfield Technical Community College
- Western MA National Tooling and Machining Association
- Western MA Economic Development Council

Industrial Partners

- Ben Franklin Design & Manufacturing
- Fosta-Tek Optics Inc
- Hayden Corp
- Hoppe Tool Inc



National Science Foundation ■ Partnerships For Innovation
Grantee's Meeting ■ April 25-27, 2010 Arlington, VA