

**Project: Montana HTAP: High-Technology Assistance Program for Micro and Nano-Technologies**  
*Bringing advanced nanotechnology to Montana businesses*

**Brief Description:**

Montana State University requests \$1.0M in FY09 to assist Montana high-technology businesses to adopt micro and nanotechnologies as a means to improve their products and increase their competitiveness. The program offers training, access to specialized facilities and technical assistance to regional businesses, and enhances the nanotechnology infrastructure of the Rocky Mountain region.

**Executive Summary:**

Montana's small, high technology businesses working on alternative energy, biotechnology, pharmaceuticals and optoelectronics are a growing and desirable sector of the state economy. Today, however, most of these Montana companies are not using microtechnology or nanotechnology as part of their portfolio, even though their competitors are. The Montana Microfabrication Facility extends nanotechnology capability to regional small businesses and researchers. The proposed program addresses a critical need by bridging the gap between companies and researchers who will benefit from micro or nanotechnology but require access to highly specialized equipment and need training and assistance to adopt these important new technologies. The program will strengthen regional nanotechnology resources, aiding small businesses that are addressing problems of economic and social importance.

As nanotechnologies become ubiquitous in the high-technology sector, the ability of companies in the rural west to adopt these technologies will be critical to their competitive survival.

*Components of the program*

- **Access** for regional businesses and university researchers to the Montana Microfabrication Facility, through a universal-access user grant program
- **Training** for users in micro and nano-technology, to include web-based training modules targeting industrial users, and assistance for intensive hands-on training
- **Design and prototype assistance** to help small companies incorporate micro and nanotechnology into their core businesses
- **Expanded Nanofabrication Resources** to serve the needs of our regional small businesses developing processes for commercialization, and research to develop core competencies to improve competitiveness of regional high-technology companies and university programs

**Congressional Action Needed:**

An appropriation of \$1.0M in FY09; Relevant agency: SBA

**Importance to Montana:**

The Montana Microfabrication Facility offers small Montana businesses local access to highly specialized and expensive nanofabrication tools and technical expertise, enabling those companies to develop and adopt innovative micro and nanotechnologies for their businesses. Now, few Montana companies have experience with or the necessary training to benefit from this resource. This program will provide that training and facilitate access while enhancing the nanotechnology resources available to high technology companies in the region. Relevant Montana companies include: *AdvR, Arcomac, Resonon, Bridger Photonics, Bridger Technologies, Crystal Growers, Lattice Materials, Ligocyte, Photon Dynamics, Scientific Materials and Sensopath.*

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**Talking Points**

- The Montana Microfabrication Facility (MMF) is a shared-use cleanroom facility housing the specialized equipment used to make the microstructured materials and devices used in sensors, optoelectronics, genomics and pharmaceuticals development and alternative energy technologies such as solar and fuel cells. This equipment is expensive, and by making it centrally located and maintained and shared by many users, **even small Montana companies and individual university researchers have access to cutting edge equipment with which to advance regional and national nanotechnology capabilities.**
- Montana State University received help from SBA to expand the Montana Microfabrication Facility (MMF) and make it accessible to Montana companies. Until recently, companies like **AdvR, Inc.** who needed microfabrication capability were traveling out-of-state to obtain it. **Now AdvR researchers are working side-by-side with MSU researchers to develop non-linear integrated optical devices for telecommunications and military customers.**
- **Montana small businesses are already using the MMF.** Engineers at **Resonon, Inc.** who needed specialty coatings for their optical mirrors obtained that service at the MMF. **Bridger Technologies, Inc.** used the MMF for electronic packaging services, and **Photon Dynamics, Inc.** is taking advantage of metrology tools in the lab. In a joint program with MSU researchers, **Bridger Photonics, Inc.** is developing new fabrication methods to create electronically controlled lenses with potentially huge impact in the camera and cell phone markets.
- In all, 31 people from 9 Montana companies have used the MMF to advance their competitiveness. Still, the majority of Montana high-technology companies do not have the training or available technical personnel to effectively use the MMF to adopt these new technologies. Specifically, companies like **Ligocyte, Arcomac, Scientific Materials, Lattice Materials,** and **SensoPath** are not currently using the MMF but would directly benefit from the available services if we can provide necessary training and technical assistance. This program meets this need, **helping companies compete in a global marketplace and helping to grow the number of companies and high-technology jobs in this region.**
- **Micro and nanotechnology, especially referring to micro and nanostructured materials and devices, continues to grow in importance, cutting across disciplines and commercial markets.** Nanoparticles form critical catalysts for electrochemical reactions to produce hydrogen or to achieve efficient energy conversion in fuel cells. Microfluidics is playing a key role in rapid genome and proteome mapping, and provides the basic technology behind massively parallel drug screening experiments. Integrated optics relies on micro and nanostructured waveguides and interfaces to achieve high performance communication systems and ultrasensitive laser radars. These are just a few examples of how micro and nanotechnologies are relevant to industries in which Montana companies are already recognized players, and in which MUS researchers are making internationally recognized contributions.
- **This program will have a national impact.** Montana small businesses and MUS researchers are distinguishing themselves in areas of national and global importance, and real synergy exists between industry and academe in these emerging high-technology fields. These companies and researchers are tackling important problems related to
  - alternative energy including fuel cells and hydrogen production
  - genetics, proteomics, and new pharmaceuticals
  - healthcare, including cancer detection and treatment and understanding the nature of infection and drug resistant bacteria
  - nation's communications backbone
  - national security and equipping our armed forces
  - global warming and environmental sensing