

# In brief

## Economic Development



### UMASS S&T INVESTMENTS REAP RETURNS FOR THE COMMONWEALTH

To friends of UMass:

As the public research university of Massachusetts, UMass is committed to promoting research and innovation throughout the Commonwealth.

Currently, our \$350 million in annual R&D expenditures ranks us third in Massachusetts and fourth in New England. We are also the leading center for R&D outside of Boston/Cambridge, with UMass campuses performing more than 90% of university R&D outside of Route 128.

However, for the state's sake, we can and must do even better. That's why I launched the President's S&T Initiatives Fund last year to assist our campuses in developing strategic alliances to pursue new S&T (science and technology) opportunities in fields important to Massachusetts. I'm pleased to report to you on the major results of our first-year S&T investments.

**MassNanoTech** — Amherst faculty have secured a \$3 million grant from NSF to establish an interdisciplinary nanoscience and engineering graduate education and training program and are under consideration for a \$20 million NSF award for a research center on hierarchical manufacturing (to be matched by \$2 million from the John Adams Innovation Institute).

**Bio-medical Imaging** — Worcester has developed a \$3 million R&D partnership agreement in biomedical imaging with Philips Electronics of Andover.

**Bio-Manufacturing** — Lowell and Dartmouth are working with leaders of the biotech industry to develop the concept of a Massachusetts Bio-Manufacturing Center. Lowell has already secured about \$750,000 worth of industry equipment and operational support.

**Security, Emergency Preparedness and Response Institute** — Amherst is leading a consortium that submitted a \$15 million proposal to the Department

of Homeland Security (matched by a \$2 million John Adams grant, contingent on DHS award).

**Marine and Ocean Technology** — Boston and Dartmouth faculty have begun developing a strategic alliance with institutions such as MIT, the Woods Hole Oceanographic Institute, and the Naval Undersea Warfare Center in Newport, RI to pursue a major federal initiative in ocean observation.

**Pioneer Valley Life Sciences Institute** — Amherst faculty have partnered with Baystate Medical Center in Springfield to secure a \$220,000 planning grant from the John Adams Innovation Institute and are well positioned to secure a \$3 million Center of Excellence grant.

The bottom line is that our \$1 million investment has helped researchers bring in \$7 million to date in new external support for R&D at UMass, with the potential to grow to \$30 million in the months ahead. Each campus has made substantial progress in building up its research enterprise and collaborating with industry and other research partners to promote innovation in all regions of the Commonwealth.

We are committed to continued growth in our research programs and in our contributions to the state economy. Accordingly, I have recently awarded a second \$1 million in S&T grants to nine projects across the UMass system (see page 3). I'm confident that these projects will set off a new wave of R&D growth for our campuses and economic opportunity for the Commonwealth.

Sincerely,

Jack M. Wilson, President

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**Amherst Scientist Wins  
\$21.8 Million Award to Study  
Biologically-Based Environmental  
Clean-up and Energy Production**

UMass Amherst microbiologist Derek Lovely has received a five-year, \$21.8 million grant from the U.S. Department of Energy to continue his team's ground-breaking work on the *Geobacter* family of microbial bacteria. Discovered by Lovely 17 years ago, the microbes process metals, such as iron or uranium, to support their metabolism, in a way that is similar to how animals use food or air. *Geobacter* is found in many types of soils, marine sediments, and deep in the earth's subsurface and could eventually be used to clean up nuclear waste facilities and other environmentally contaminated sites. Lovely and his colleagues recently reported that in order to get access to metals in the environment, *Geobacter* grow hair-like wires through which electrons appear to move. This opens up additional possibilities for producing energy from waste matter or biomass.

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**RNAi Pioneer at UMass  
Medical School Elected to  
National Academy of Sciences**

UMass Medical School faculty member Craig Mello was elected earlier this year to the National Academy of Sciences, one of the highest honors that can be accorded to a U.S. scientist or engineer. He was recognized for his work in the discovery of RNA interference (RNAi). The technology offers the potential for managing disease at a cellular level by silencing or "turning off" the function of targeted genes. RNAi has had a significant impact on drug discovery and development and was *Science* magazine's "Breakthrough of the Year" for 2002. The university has licensed this technology to more than 45 companies. Mello was named a Howard Hughes Medical Institute Investigator in 2000 and also holds the Blais University Chair in Molecular Medicine at the school.

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**Green Chemistry Leader  
at UMass Lowell Receives  
Presidential Award for Excellence**

UMass Lowell faculty member John Warner, a founder of the field of green chemistry — the design and use of chemical products and processes which minimize environmental and human health impacts — was recently named one of 14 recipients of the 2004 Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring. The program honors individuals and institutions that have enhanced the participation of members of under-represented groups in the science, mathematics, and engineering disciplines. Warner, director of the green chemistry doctoral program, was cited specifically for peer mentoring programs that have helped a number of students complete bachelor's and graduate degrees. Warner also edits two green chemistry journals and has a number of patented technologies incorporating green chemistry principles.

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"President Wilson's S&T Initiatives Fund has had an impact far beyond the \$1 million invested.

These funds have focused the campuses on collaboration with industry and other research

institutions that will support substantial new economic development in the state's regions."

**WILLIAM GUENTHER,  
President, Mass Insight**

## **MassNanoTech Awarded \$3 Million Graduate Education and Training Grant**

MassNanoTech is the recipient of a \$3.1 million NSF award to launch an interdisciplinary graduate education and training program in nanotechnology. Through this program, doctoral students in six departments — chemistry, chemical engineering, electrical and computer engineering, mechanical and industrial engineering, physics, and polymer science and engineering — will receive financial support and benefit from a coordinated program including courses and seminars, research, internships, and advising. In addition, through a partnership with the campus's Isenberg School of Management, students will participate in group projects to develop prototypes of nanoscale devices and strategies for their commercialization.

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## **Amherst Team to Develop Techniques for Detection of Toxins**

UMass Amherst scientists won a three-year, \$1.3 million grant from the Office of Naval Research to develop new techniques for detecting toxins linked to abnormal functioning of the human reproductive, immune, and nervous systems. This class of chemicals, called endocrine disruptors, is a byproduct of many industrial processes. Improved detection methods are important because even low levels of exposure could be dangerous. Researchers will design specially coated nanoparticles to capture small amounts of toxins for assembly into larger structures and analysis using mass spectrometry. They anticipate that these novel techniques will enable identification of endocrine disruptors with unprecedented sensitivity.

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## **UMass President's S&T Initiatives Fund 2005 Projects**

### **INSTITUTE FOR CELL ENGINEERING (Amherst)**

Collaboration between the departments of chemical engineering and veterinary and animal sciences to stimulate research and training in cell engineering

### **POLYMER-BASED DRUG DELIVERY INITIATIVE (Amherst)**

Project to advance R&D and industry collaboration on polymer-based drug delivery systems, focusing on drug-eluting stents

### **STRATEGIC ALLIANCE FOR FOOD-BASED SOLUTIONS TO HEALTH AND WELLNESS (Amherst)**

Development of academic-industry R&D consortium on nutraceuticals and functional foods

### **MICROARRAY AND BIOINFORMATICS CORE FACILITY (Boston)**

Research and industry collaboration initiative combining to support genomic characterization

### **OCEAN OBSERVATORY INITIATIVE (Dartmouth/Boston)**

Collaborative effort with MIT, the Woods Hole Oceanographic Institute and the marine industry to pursue federal support for an ocean observatory

### **MASSACHUSETTS MEDICAL DEVICES DEVELOPMENT CENTER (Lowell/Worcester)**

Joint effort to support small and emerging medical device companies in engineering, product development and clinical trials

### **PROTEOMICS CONSORTIUM (Worcester)**

Development of a proteomics consortium that will provide proteomics services to academics and the biotech industry

### **STATEWIDE DRUG DEVELOPMENT SERVICE CENTER (Worcester)**

Support for participation in a Mass Insight-led effort with industry to develop a model for a shared imaging facility

### **UMASS/BADEN-WÜRTTEMBERG S&T FACULTY EXCHANGE**

System-wide faculty exchange with universities in southern Germany, one of that country's leading advanced technology regions

# Technology Commercialization &

## UMass Technology Licensing Generates \$28.7 Million in Income

The UMass Office of Commercial Ventures and Intellectual Property (CVIP) reported continued growth in technology licensing activities in FY 2005, with record performance in key categories. With 50 agree-

ments executed, activity in this area is at its highest since the office was established in 1995, doubling in just the past three years. Licenses have generated \$28.7 million in income, also a record. In addition, researchers disclosed 121 inventions and UMass received 15 new patents. While technologies from the Worcester campus increased over last year and continue to make the largest contribution to the university's licensing revenues, highlighting the importance of academic research to the life sciences industry, revenues from the Amherst and Lowell campuses also increased significantly this year.

UMass will receive an up-front fee and royalty payments on future sales.

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## Industry Executives Chosen to Lead Worcester and Amherst Tech Transfer Offices

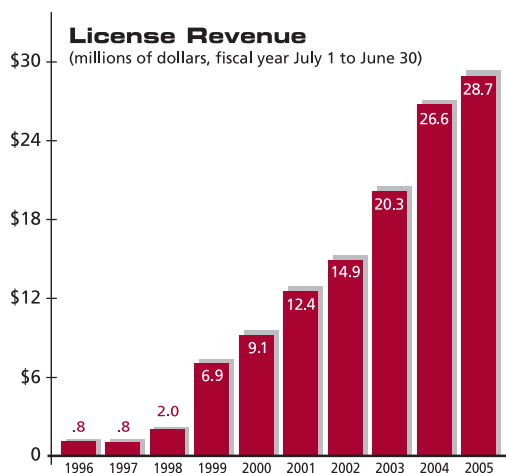
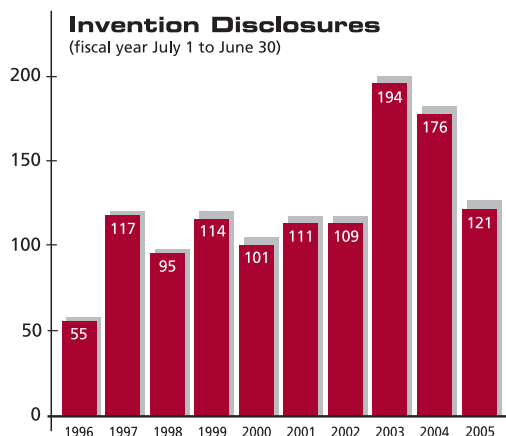
UMass Medical School and UMass Amherst recently welcomed new directors of technology transfer. Each brings significant industrial experience in technology licensing and intellectual property portfolio management. James McNamara comes to UMass Medical School from SRI International, where he was senior director of business development of its biosciences division, a drug discovery and development activity with annual revenues of \$30 million. He holds a Ph.D. in medicinal chemistry from the University of Connecticut. Nicholas DeCristofaro comes to UMass Amherst from Metglas, Inc., the amorphous metals division of Hitachi Metals America, where he was previously director of technology and most recently managed the integration of two advanced materials business units resulting from Hitachi's acquisition of Metglas in 2003. He holds a Ph.D. in materials science from MIT.

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## UMass Lowell Licenses Polymer Technology to Boston Scientific

Professor Rudolf Faust has performed pioneering work in the field of living cationic polymers for more than a decade, receiving support for his research from, among others, Boston Scientific Corporation. Boston Scientific is the leading supplier of stents, medical devices used to open narrow or clogged arteries and restore blood flow. The new polymer is well suited for the task at hand — eluting a drug to the site of the stent to mitigate the risk of restenosis (the re-narrowing of a blood vessel, thereby restricting blood flow). The exclusive license with UMass Lowell incorporates rights to five patents pending and issued. Under the terms of the agreement,



# ENTREPRENEURSHIP

## **CVIP Makes Four Awards for Technology Development**

The Office of Commercial Ventures and Intellectual Property (CVIP) recently announced grants to four UMass investigators to accelerate the commercialization of technologies developed in their laboratories. These funds provide supplemental support enabling researchers to advance the technologies to the proof of concept stage or take other critical steps to make them attractive for either licensing or other forms of commercialization. Funding for these activities is typically unavailable from federal agencies or other sponsors. The awardees are Jayant Kumar, Lowell (micron/sub-micron substrate patterning); Lloyd Semprevivo, Amherst (echinococcus vaccines); Dhandapani Venkataraman, Amherst (copper catalysts for cross-coupling reactions); and Philip Zamore, Worcester (micro RNA tether technology).

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## **UMass Dartmouth Partners with New Bedford on New Small Business Incubator**

The Quest Center, a new small business incubator with a special focus on marine science and technology companies, recently opened in downtown New Bedford. Through a partnership with the city, the UMass Dartmouth-managed center will provide rental space and business development and networking assistance for as many as 10 tenants. Center director David Sheehan, who previously led the campus's Office of Commercial Ventures

and Intellectual Property, anticipates strong partnerships will develop between Quest and the School of Marine Science and Technology. The first tenant in the center's 12,000-square-foot facility is Brooke Ocean Technology Ltd., a marine instrumentation, systems engineering, and R&D services firm.

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## **Massachusetts Technology Transfer Center Provides Development Funding**

The Massachusetts Technology Transfer Center (MTTC) has announced the first recipients of its Technology Investigation Awards and Technology Assessment Awards. The center made five Investigation Awards of \$25,000 each to demonstrate the viability of new technologies in fields ranging from integrated circuits to drug development to medical devices. Researchers at Massachusetts Eye and Ear Infirmary, Tufts University, UMass Amherst, UMass Medical School, and Worcester Polytechnic Institute received the awards. In addition, five technology Assessment Awards of \$5,000 were awarded to Children's Hospital Boston, Northeastern University, Tufts University, UMass Amherst, and Worcester Polytechnic Institute to support the assessment of commercial applications of new technologies. The center has also announced its upcoming schedule of events (see sidebar).

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## **MASSACHUSETTS TECHNOLOGY TRANSFER CENTER**

### **CALENDAR OF EVENTS**

**November 7, 2005**

#### **Clean Energy Conference**

Boston Park Plaza Hotel

**December 5, 2005**

#### **Early Stage Nanotechnology Showcase**

Newton Marriott Hotel

**March 2006**

#### **Invention to Venture Life Sciences Workshop**

Harvard University

**March 10, 2006**

#### **Invention to Venture Workshop**

UMass Amherst

**April 2006**

#### **Invention to Venture Workshop**

UMass Lowell



# DEVELOPING THE

# Future Workforce

## **UMassOnline Wins U.S. Distance Learning Association Best Practice Award**

UMassOnline is the recipient of the U.S. Distance Learning Association's 21st Century Best Practice Award, given to an agency, institution, or company that has shown outstanding leadership in the field of distance learning. Created in 2001, UMassOnline offers accredited educational programs taught by UMass faculty to people in the Commonwealth, nationally, and internationally. Combining innovative curricula, high-quality teaching, an interactive community of learners, and access to research resources and support, it provides access to more than 45 of the University's degree and certificate programs. More than 900 courses are offered annually by UMassOnline to over 17,500 students.

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## **President Jack Wilson Co-Chairs Mass Insight Education Study on K-12 Science and Math Education Reform**

Co-chairing a task force of university and business leaders, UMass President Jack Wilson and Nellie Mae Educational Foundation President and CEO Blenda Wilson (no relation) led a study which provides a blueprint for revitalizing K-12 math and science education and creating a competitive workforce able to succeed in an increasingly technological world. Entitled *World Class: The Massachusetts Agenda to Meet the International Challenge*

*for Math- and Science-Educated Students*, the task force report emphasizes teacher training, curriculum reform, and rigorous standards to boost achievement and enhance and enlarge the pipeline of students pursuing careers in science, technology, engineering, and mathematics (STEM) fields. Governor Romney and legislative leaders have endorsed the report's recommendations and indicated that the measures will be incorporated into upcoming education reform legislation.

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## **UMass Boston Science Educator Receives National Award**

Arthur Eisenkraft, Distinguished Professor of Science Education at UMass Boston, was honored by the National Science Teachers Association with its 2005 Distinguished Service to Science Education Award. A physics teacher for much of his career, his work focuses on bridging the gap between research and practice in science education, making science accessible to all students. He is co-director of the Boston Science Partnership, a \$12.5 million NSF-funded program to improve science education for nearly 33,000 middle- and high-school students in the Boston Public Schools. He also led the development of the Active Physics curriculum for high school students, which is used by more than 200,000 students nationwide. Eisenkraft previously received the U.S. Presidential Award for Excel-

lence in Science Teaching and the American Association of Physics Teachers Distinguished Service Citation.

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## **Federal Funding Renewed for UMass Lowell-based Regional Hazardous Waste Training Coalition**

UMass Lowell is the home of The New England Consortium (TNEC), a university-labor partnership that, since 1987, has provided health and safety training to hazardous waste workers and emergency first-responders. TNEC provides training to more than 800 people annually, through more than 60 open-enrollment and company-specific courses. Part of a national network of 18 organizations authorized and funded by the National Institute of Environmental Health Sciences (NIEHS), federal support for TNEC was recently renewed at more than \$1 million per year. In addition to delivery of training programs, TNEC has provided expertise toward the development of federal standards for hazardous waste handling and emergency response. Department of Community Health and Sustainability faculty member Craig Slatin is TNEC director and principal investigator.

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# ECONOMIC ANALYSIS for the COMMONWEALTH

## **UMass Economic Research Supports the Commonwealth's BRAC Effort**

The UMass Donahue Institute and UMass Dartmouth's Center for Policy Analysis provided critical research support to the Commonwealth's efforts to preserve military installations under review as part of the Base Realignment and Closure (BRAC) process. They produced two in-depth reports which documented the substantial economic contributions of these installations. The first report examined the economic impacts of Hanscom Air Force Base and the Natick Soldier Systems Center, determining that the two facilities are responsible for more than 33,000 jobs and more than \$3.2 billion in regional economic activity. The second report examined the economic, fiscal, and operational consequences of the proposed closure of the 102nd Fighter Wing of the Massachusetts Air National Guard (based at Otis Air Force Base on Cape Cod). The work was sponsored by the Massachusetts Defense Technology Initiative, a public-private collaboration organized by the Massachusetts High Technology Council.

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## **UMass Study Documents Emerging Opportunities in Marine Science Industry**

The UMass Donahue Institute, in collaboration with UMass Dartmouth and UMass Boston, recently released a report entitled *The Marine Science and Technology Industry in New England*. The study found that New England's \$4.8 billion marine science industry is a formidable economic engine with significant potential for growth. However,

the study demonstrated that the industry could run aground in the global race for investment unless it can find more highly skilled workers and research support. The study was authored by Professor Clyde Barrow (UMass Dartmouth), Professor David Terkla (UMass Boston), and Rebecca Loveland of the UMass Donahue Institute and sponsored by the UMass President's S&T Initiatives Fund, the SouthCoast Development Partnership, and a number of public and private and public organizations.

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## **Massachusetts Regional Benchmarking Project Underway**

The UMass Donahue Institute has initiated a project to develop economic benchmarks and indicators for the seven principal regions of the Commonwealth. These measures will be designed to provide policymakers with timely and relevant information and a means for tracking progress towards the achievement of economic development goals. In addition to assessing traditional economic conditions, the project will include indicators specifically designed to enhance understanding of the technology base of the state's regional economies. These indicators will be prepared by faculty and students associated with UMass Lowell's Center for Industrial Competitiveness. The project is supported through a grant from the U.S. Department of Commerce.

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“The UMass study was a critical component in our efforts to keep Hanscom and Natick open. More than describing their economic impact on the Commonwealth, it revealed how the bases’ strong relationships with our defense technology community help them achieve their mission.”

**CHRISTOPHER R. ANDERSON, President, Massachusetts High Technology Council**

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