

In brief

Economic Development



UMASS POISED TO SUPPORT STATE GOALS IN THE LIFE SCIENCES AND CLEAN ENERGY

To Friends of UMass:

I was honored to join Governor Patrick and a delegation of state, academic and business leaders from the life sciences and clean energy industries on a recent trip to China. Collectively, we presented Massachusetts as an important global partner for China.

The University of Massachusetts is a strong component of this partnership, as we are establishing ourselves as a world-class leader in the life sciences and clean energy in terms of research, education and contributions to economic development. Our proven capabilities and plans for the future position us well to support the Commonwealth's goals for global leadership in these two sectors.

A Leader in the Life Sciences

In the life sciences, UMass conducts nearly \$250 million annually in R&D, second only to Harvard in the state. Thanks largely to success in the life sciences, we generated over \$40 million last year in technology licensing earnings, second only to MIT in the state and among the top 15 universities in the nation. We also produce more life sciences bachelor's degrees than any university in the Commonwealth.

The quality of our research is best exemplified by Dr. Craig Mello's Nobel Prize-winning work on RNAi. But, our faculty members are also leaders in fields ranging from gene therapy to apoptosis. We are developing one of the world's leading stem cell banks and the first-ever worldwide stem cell registry. And, we are active in licensing technologies to companies such as Cytoc and Boston Scientific and have launched three new life sciences companies in the past year.

Through new efforts such as the BioManufacturing Center and the Massachusetts Medical Device Development Center, we support companies in converting innovative ideas into commercial products. We also are leading the Massachusetts Life Sciences Talent

Initiative to help chart the course for future workforce initiatives in the Commonwealth.

A Growing Force in Clean Energy

In clean energy, UMass conducts nearly \$20 million annually in R&D. Our faculty members are leaders in fields such as offshore wind energy and microbial fuel cells. We also have leading programs in areas such as biofuels and photovoltaics, and promising new initiatives in areas such as marine renewable energy. We also are leaders in the economic and policy analysis of clean energy and climate change.

In recent months, the University has helped the state win a national testing center for wind energy from the U.S. Department of Energy, won an NSF competition for a national center on hydrogen-based energy, and launched a promising biofuels start-up company called SunEthanol.

Every day, UMass is carrying out its role as the Massachusetts innovation engine. As state leaders consider policies and investments to further develop the state's position in the life sciences and clean energy, we urge them to look to UMass as a high-quality, highly-engaged public research university that provides talent and innovation across the state. For our part, we are committed to doing all we can to support the Commonwealth's goal of global leadership in these important sectors.

Sincerely,

Jack M. Wilson, President

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Life Sciences Center Awards \$8.2M to UMMS for Stem Cell Efforts

The Massachusetts Life Sciences Center made two awards to the UMass Medical School (UMMS) for the establishment of the Massachusetts Human Embryonic Stem Cell (hESC) Bank and an international Massachusetts hESC Registry. These grants will support the development of the field and maintain the Commonwealth's position as a global leader. The bank will serve as an international repository of stem cells derived in Massachusetts and beyond. Through collaborative efforts of universities and teaching hospitals throughout the Commonwealth, the bank's mission is to provide to researchers and companies worldwide hESC lines so that they may conduct essential investigations leading to potential therapeutic applications. The registry will comprise a comprehensive and extensively documented international hESC database and will promote the efficiency of hESC research and the disbursement of information.

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Boston-Led Partnership Receives \$7.7M NIH Grant for Health Disparities Research

UMass Boston has been awarded a \$7.7 million, five-year grant from NIH to establish a center for health and health disparities with an emphasis on community-based participatory research. The campus, along with Harvard's School of Public Health and Brigham and Women's Hospital, is partnering with the Cherishing Our Hearts and Souls Coalition of Roxbury, to conduct health disparities-related research projects, offer training with an emphasis on community-based participatory

research, and build a neighborhood infrastructure that can develop and implement best practices in collaboration with academic institutions.

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UMass Helps Commonwealth Win Wind Technology Testing Center

The U.S. Department of Energy's National Renewable Energy Laboratory (NREL) selected a Massachusetts partnership that includes UMass Amherst's Renewable Energy Research Laboratory (RERL) to build and operate a test facility for large-scale wind turbine blades. The Wind Technology Testing Center, one of two such facilities in the nation, will be located in Charlestown. Wind turbine blades of up to 230 feet long, which are suitable for deep-water offshore wind farms, can be tested at the facility. The facility was identified by the Commonwealth as a priority because it is expected to spur development of the wind energy industry in this country. Under the agreement, NREL will provide \$2 million in capital equipment to the project. Amherst's RERL, one of the premier wind engineering graduate programs and research centers in the U.S., will manage the facility's technical programs. Other partners include the Commonwealth's executive offices for Housing and Economic Development and Energy and Environmental Affairs, the Renewable Energy Trust, and MassDevelopment.

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Amherst Institute for Cellular Engineering Wins \$3M NSF IGERT Award

The Institute for Cellular Engineering at Amherst, established in 2005 with support from the President's Science and Technology Initiatives Fund, recently received a \$3 million grant from NSF's Integrative Graduate Education and Research Training (IGERT) program. The funding will provide graduate students with fellowships, training, and hands-on research opportunities, enhancing the quality of their education and better preparing them for careers in industry and academia. It is the first training program on the campus designed specifically to address the interface between engineering and the life sciences, and will enable students to work with faculty members in areas such as artificial organ and tissue generation, targeted drug delivery systems and biofuels. The program includes summer and semester research and training activities, mentoring, interactions with industry researchers and formal professional development.

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NSF Funds Fuel Cell Research Center at Amherst

UMass Amherst will establish a research center focused on hydrogen fuel cell science with a \$1.5 million, three-year grant from NSF. The Fueling the Future Chemical Bonding Center was one of only three in the nation selected in a recent competition, and the center will be eligible to compete for follow-on funding totaling up to \$30 million over the next ten years. Improving understanding of proton transfer, the underlying mechanism of fuel cell technology, is the primary research goal of the center. Proton transfer is widespread in the

biological world — in human cells, for example — and occurs at high levels of efficiency. Significantly increasing the efficiency of this activity within a fuel cell would increase the attractiveness of this technology as an alternative to fossil fuels.

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System-Wide Working Group Developing Clean Energy Strategy

In recognition of the growing importance of clean energy in the Commonwealth and of the University's considerable capabilities in this area, a system-wide working group has been organized to chart the University's future developments in this area. The group is chaired by UMass Amherst Vice Provost for Research Paul Kostecki and includes representatives of the Boston, Dartmouth, and Lowell campuses. Its goal is to support the Commonwealth's efforts in positioning Massachusetts as a global hub for clean energy. The working group is examining potential growth opportunities in areas of well-established strength such as wind power, biofuels and fuel cells as well as new fields such as marine renewable energy. The group will be actively consulting with the Executive Office of Energy and Environmental Affairs and the New England Clean Energy Council in early 2008 and plans to issue its final report in the spring.

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UMass President's S&T Initiatives Fund 2007 Projects

The President's Initiatives Funds makes awards annually to support faculty research and scholarship in fields important to Massachusetts. The Science and Technology Initiatives Fund was established in 2003 and the Creative Economy Initiatives Fund was launched in 2007. With a total investment of nearly \$1.5 million, the following projects were selected:

S&T INITIATIVES FUND

Advancing Technology-based Interdisciplinary Health Promotion Research — Boston

Center of Excellence in Wireless Communications — Amherst

Center for Human-Robot Interaction — Lowell

Massachusetts Center for Networked Sensing in Challenged Environments — Amherst, Dartmouth, Lowell

UMass Institute for Stem Cell Research and Regenerative Medicine — Worcester, Amherst

UMass NanoMedicine Institute — Amherst, Worcester, Lowell

University Collaborative for Intelligent Transportation Systems — Dartmouth, Amherst, Boston, Lowell

CREATIVE ECONOMY INITIATIVES FUND

Benchmarking SouthCoast and Pioneer Valley Creative Economies — Amherst, Dartmouth

Creating an Urban Village Arts Scene — Lowell

Dance in Three Stages — Amherst

The Ethnic Media Project and New England Ethnic Newswire — Boston

A Partnership with the Boston Public Library for Access to Rare Books — Boston

Two-pronged Project on Behalf of Lowell's Creative Economy — Lowell

Workforce Development Regionalism — Boston

Technology Commercialization &

FY 2006 UNIVERSITY TECHNOLOGY LICENSING (dollars in millions)

University of California	193.5
New York University	157.4
Stanford University	61.3
Wake Forest University	60.6
University of Minnesota	56.2
Massachusetts Institute of Technology	43.5
University of Florida	42.9
University of Wisconsin	42.4
University of Rochester	38.0
University of Washington	36.2
Northwestern University	30.0
University of Massachusetts	27.2
University of Colorado	21.2
Harvard University	20.8
University of Michigan	20.4

Source: Association of University Technology Managers

UMass Continues National Leadership in Licensing Income in FY 2006

The 2006 survey of the Association of University Technology Managers (AUTM) confirms UMass's continued role as a national leader in technology licensing. The University generated \$27.2 million of licensing income in FY 2006. This ranked the University second only to MIT in Massachusetts and among the top 15 universities nation-wide. The top-ranked universities responding to the AUTM survey are shown in the sidebar.

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New Clean Energy Start-up Based on Amherst Biofuels Technology

The Amherst campus recently announced the creation of a new start-up company, SunEthanol, to commercialize a process for converting cellulose (e.g., wood chips, switchgrass) to ethanol. The process for developing what is called "cellulosic ethanol" is based on the research of professor of microbiology Susan Leschine and staff researcher Tom Warnick. Their technology uses a naturally occurring microbe, called the "Q-microbe technology", based on the discovery of the Q microbe in soil near the Quabbin Reservoir. The company is located in Amherst and has been backed by a group of investors that includes Vera-Sun, Battery Ventures, AST Capital and Long River Ventures.

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John Adams Fund Supports Massachusetts Medical Device Development Center (M2D2)

The John Adams Innovation Institute awarded the Massachusetts Medical Device Development Center (M2D2) a \$500,000 grant to support its efforts to assist inventors and entrepreneurs in bringing promising medical device technologies to the commercialization stage. A joint effort of Lowell and the Medical School, M2D2 conducts proof-of-concept work, undertakes prototyping and testing, and assists with early stage clinical trials. Over the next year, the center expects to assist roughly ten companies and anticipates having two to three new products ready for hand-off to investors. This award follows previous investments by the Institute and the President's Science and Technology Initiatives Fund. In addition, M2D2 has partnered with three companies on SBIR/STTR grants totaling about \$1.5 million.

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Lowell License Brings New Company to Merrimack Valley

UMass Lowell has licensed biodegradable plastics technology developed by professor of plastics engineering Stephen McCarthy

to Metabolix, a Cambridge-based bio-science company. The company has entered into a joint venture with Archer Daniels Midland Company, one of the world's leading processors of agricultural products. The new company, called Telles, will manufacture and market a line of biodegradable plastics made from renewable resources such as corn sugar. Citing its close research and development ties with the Lowell campus, Telles's sales and marketing headquarters has been established at Wannalancit Mills in Lowell. The new venture initially houses fifteen employees and is expected to grow to over 40 in the coming year.

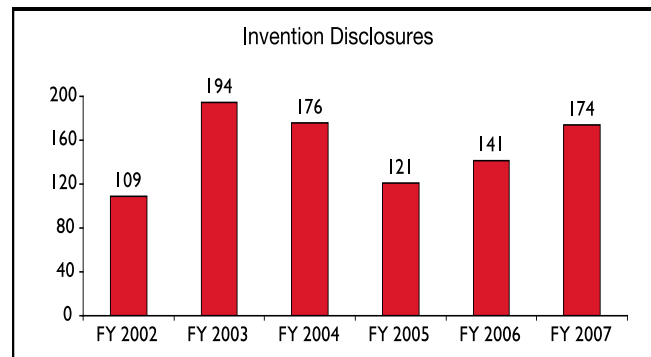
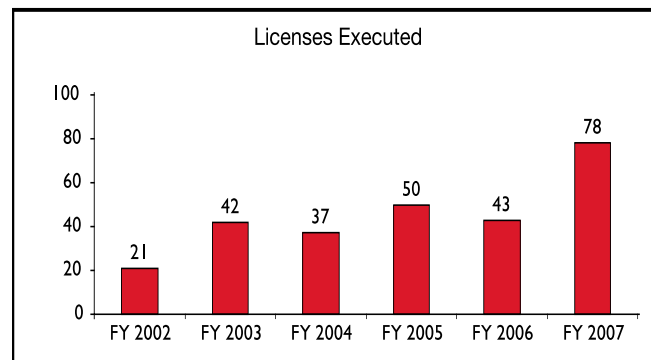
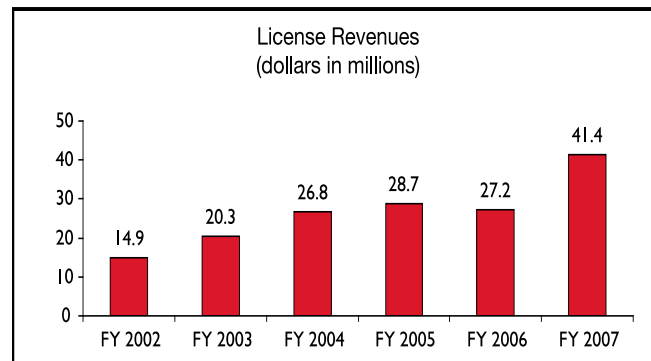
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Technology Licensing Generates \$41.4M in FY 2007

The Office of Commercial Ventures and Intellectual Property (CVIP) reported a record-breaking year of activity in licensing (78 licenses) and license income (\$41.4 million) during FY 2007. Technologies from the Medical School continue to provide the bulk of the University's licensing and revenue activity, highlighting the importance of academic research to the life sciences industry. Nearly \$10 million of FY 2007 earnings resulted from stock sales in companies that had licensed RNAi technology.

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UMASS TECHNOLOGY LICENSING METRICS



DEVELOPING THE Future Workforce

“The UMass-led Life Sciences Talent Initiative provides an excellent opportunity for industry to work with government and higher education in helping shape the Commonwealth's talent strategy and ensure industry's talent needs are met in the future.”

— ZOLTAN CSIMMA
Senior Vice President
and Chief Human
Resources Officer,
Genzyme Corporation

UMass Leads Life Sciences Talent Initiative

In partnership with the Massachusetts Life Sciences Center and the Massachusetts Biotechnology Council, the UMass Donahue Institute is developing a comprehensive workforce strategy to ensure that the Commonwealth maintains its global leadership in the biomedical life sciences. With guidance from an external advisory committee chaired by Genzyme senior vice president for human resources Zoltan Csimma, the initiative will identify current and projected talent needs of the life sciences industry and provide a framework for colleges, universities and training institutions to cooperate with industry in increasing the supply of workers prepared to succeed in biomedical research, development and manufacturing. Preliminary findings will be reported to Governor Patrick and other leaders at the Life Sciences Talent Summit on February 1, 2008 at UMass Boston, with a final report and recommendations anticipated for early summer.

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Wilson Chairs National Commission on Online Learning

President Jack Wilson, a leader in online education and founding CEO of UMassOnline, currently chairs the National Commission on Online Learning, a joint project of the Alfred P. Sloan Foundation and the National Association of State Universities and Land-Grant Colleges (NASULGC). The commission recently completed a survey of NASULGC members on their use of online programs a means to achieve broader institutional goals, such as diversity, retention, internationalization and accountability. Survey results indicate that while many universities offer online programs and believe that they are critical for long-term success, only a few institutions have fully incorporated them into strategic planning and are leveraging them to address

key challenges. The commission is directly engaging university presidents and chancellors to make them aware of the opportunities that online learning provide, and over the next year will develop a set of tools and resources to promote the use of online as a strategic asset. Toolkit examples could include case studies, benchmarking data and a national recognition program for individuals and institutions demonstrating innovation and leadership in online programs.

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Dartmouth Promotes Mathematics Education with \$2M Grant

The James J. Kaput Center for Research and Innovation in Mathematics Education at Dartmouth recently received a \$2 million grant from the U.S. Department of Education to analyze and evaluate strategies to excite students about learning mathematics and increase the number and diversity of students in the science, mathematics and engineering education pipeline. The center has developed SimCalc MathWorlds, a software-based educational toolkit that uses computer animations, real-life examples, narrative stories and other engagement methods to explain fundamental mathematics concepts. Studies indicate that use of the SimCalc approach along with supporting curriculum and teacher training significantly improves student mathematics performance, and that improvements were sustained across racial and socioeconomic groups. The federally-funded project will further evaluate the use of SimCalc on student performance in a study involving a number of school districts in the SouthCoast region.

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ECONOMIC ANALYSIS

for the COMMONWEALTH

Population Estimates Program Launched at UMass Donahue Institute

Work by the UMass Donahue Institute and the Office of the Secretary of the Commonwealth has commenced on the Population Estimates Program (PEP). In its first year, PEP will focus on the following tasks: expanding analysis of all people living in "Group Quarters" within Massachusetts; developing municipal inventories of building and demolition permits in order to estimate the change in the numbers of housing units in Massachusetts cities and towns; preparing independent state, county, and local population estimates; providing the U.S. Census Bureau with timely feedback and technical review of materials; and providing relevant technical assistance to the Secretary of the Commonwealth and to individual cities and towns in the event of a challenge to the official national population estimates. The collected data will be presented to the Secretary of the Commonwealth, as well as the U.S. Census Bureau to update existing figures to help identify population growth, all of which are expected to lead to increased federal funding for the state.

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Massachusetts Statewide STEM Indicators Project Measures Performance

The Massachusetts Statewide STEM Indicators Project (MASSIP) is a joint research initiative of the UMass Donahue Institute

and the Massachusetts Board of Higher Education. The project annually tracks and analyzes education and workforce development indicators in science, technology, engineering and mathematics (STEM). The indicators cover a range of areas, including teacher preparation, student interest and achievement, college degree completions, and employment. Where possible, MASSIP provides benchmarking against the Commonwealth's competitor states. An initial, baseline data report was completed in 2006. A second data report that begins to track changes will be available in early 2008. During the Spring of 2008, the project will begin publishing breakout data and highlights reports that target information of special interest and importance.

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UMass Supporting the Commonwealth's Housing Policymakers

The UMass Donahue Institute has been engaged by the Department of Housing and Community Development to evaluate the current housing market in each of the seven Benchmarks regions of the state (Boston Metro, Northeast, Southeast, Cape & Islands, Central, Pioneer Valley, and Berkshire), and to project regional housing market trends over the next five

years. The purpose of this study is to provide critical information to help guide the Commonwealth's housing investment strategy and public policy decisions. The study will examine and report on housing needs, supply and demand (and mismatch), and trends for each of several population groups on a region-by-region basis. The final product will be a detailed written report with supporting maps and summary tables and charts designed to be accessible to stakeholders who shape housing policy in Massachusetts both within and outside of the State House.

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