

In brief

Economic Development



AN HISTORIC TIME FOR R&D AT UMASS

To Friends of UMass:

The University of Massachusetts is the Commonwealth's public research university and 2006 was an historic year for the research enterprise at the University. Our success has continued and 2007 promises to be even better.

A Nobel Prize-Winning University

The high point of a great year was the award of the 2006 Nobel Prize in Medicine or Physiology to Professor Craig Mello of UMass Medical School. The prize was given to Dr. Mello and his collaborator, Dr. Andrew Fire of Stanford University, for their work in RNA interference (RNAi), a fundamental mechanism for controlling the flow of genetic information in cells. Their understanding of this mechanism has produced gene silencing technology that offers the potential for an exciting new generation of therapeutics.

A Record Year in R&D Spending

For the first time in its history, research and development (R&D) expenditures at UMass exceeded \$400 million. This ranks UMass third in Massachusetts, fourth in New England, and 35th nationally. The University also achieved a record-setting \$21 million in industry-sponsored R&D during 2006.

Thanks largely to the success at our Medical School, we had another productive year in technology transfer, generating over \$27 million in technology licensing income, ranking us among the nation's top 15 universities.

Unprecedented Success in R&D Competitions

Members of the UMass faculty demonstrated their increasing ability to compete in and win the most rigorous research competitions. Led by Professors Jim Watkins and Mark Tuominen and supported by \$7 million in state matching funds, Amherst won a \$16 million grant in the National Science Foundation's (NSF's) Nanoscale Science and Engineering program.

Amherst, through the leadership of Professor Derek Lovely, also won a \$21 million grant from the Department of Energy to explore ways in which a particular type of microorganism can help produce electricity from renewable resources. Lowell, thanks to the efforts of a team led by Professor Robert Giles, won a \$27 million grant from the Department of Defense for its Submillimeter-Wave Technology Laboratory — the largest grant in its history. Numerous other faculty members won major grants during 2006 in fields ranging from urban health at UMass Boston to marine science at UMass Dartmouth.

Strategic New State Investments

As part of the Commonwealth's economic strategy, the Legislature approved and Governor Deval Patrick released \$35 million in state funds to build a nano-bio manufacturing facility at Lowell and launch a University-led, statewide Massachusetts BioManufacturing Center. This support will enable UMass to help position the state as a global leader in nano- and biomanufacturing.

Last month, the Governor, with support from legislative leaders, announced a \$1 billion initiative to make Massachusetts the global leader in the life sciences. The initiative calls for a stem cell bank and RNAi center at UMass and provides opportunities for the University to participate in regional innovation centers, workforce development and technology commercialization.

Our achievements demonstrate the continued development of UMass as a world-class research university. And, it provides further evidence of the extraordinary return on the state's investment in the University of Massachusetts.

Sincerely,

Jack M. Wilson, President

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“The investment in this building (at UMass) is just a piece of a broader move to secure our leadership role in nanotechnology and biomanufacturing.”

— **The Honorable Deval Patrick, Governor**

“Our economic prosperity is dependent on the commercialization of new technologies. The nano-bio manufacturing center in Lowell is key to the economic growth of our region and our state.”

— **Sen. Steven Panagiotakos**

State Supports \$35 Million Nano-Bio Manufacturing Initiative at Lowell

In April, President Wilson joined Governor Deval Patrick when he announced the release of \$35 million in state funds for construction of a nano-bio manufacturing facility at UMass Lowell and to launch the UMass-led Massachusetts BioManufacturing Center. These funds were originally approved by the Legislature as part of the 2006 economic stimulus legislation. The facility represents the first new academic building at the Lowell campus in decades. Meanwhile, the Center will help the Commonwealth retain and attract high-quality bio-manufacturing jobs by offering biotechnology firms an array of research, education, process development and other services. It is a statewide initiative involving UMass Lowell and Dartmouth, WPI, and other higher education institutions, and was developed in partnership with the Massachusetts Biotechnology Council.

Contact: Carl Lawton, Professor of Chemical Engineering, UMass Lowell and Director, Massachusetts BioManufacturing Center, (978) 934-3158, carl_lawton@uml.edu.

Amherst Professor Wins NIH Director's Pioneer Award

Lila Gierasch, Distinguished Professor of Biochemistry and Molecular Biology and Chemistry at Amherst, was a 2006 recipient of the prestigious National Institutes of Health (NIH) Director's Pioneer Award. The program, initiated in 2004, is a highlight of the NIH Roadmap for Medical Research. The award honors individual scientists of exceptional creativity who propose pioneering approaches to major challenges in biomedicine. Each of the 13 investigators selected receives \$2.5 million over five

years. Gierasch's research focuses on protein folding and protein-peptide interactions. She will use her Pioneer Award to develop new ways to observe the process of protein folding *in vivo*. This work will provide the fundamental knowledge needed to understand diseases associated with protein misfolding, such as Alzheimer's and other neurodegenerative diseases.

Contact: Lila Gierasch, Professor of Biochemistry and Molecular Biology and Chemistry, UMass Amherst, (413) 545-6094, gierasch@biochem.umass.edu.

Lowell's Submillimeter-Wave Technology Lab Wins \$27 Million from U.S. Army

The Submillimeter-Wave Technology Laboratory (STL) at Lowell recently received the largest award in the history of the campus — a five-year, \$27 million renewal grant from the U.S. Army's National Ground Intelligence Center (NGIC). The Lab's program focuses on developing radar signature data for battlefield objects such as ships, tanks, tactical vehicles, and even spent fuel containers and other clutter. This data underpins the target recognition algorithms that enable radar systems. Researchers at STL have worked since the early 1980s to develop and refine scale versions of radar systems and targets to collect signatures under various terrain and environmental conditions. The Lab is also a partner of the Expert Radar Signature Solutions consortium, which is also managed by the NGIC and includes the Aberdeen Proving Ground and the University of Virginia.

Contact: Robert Giles, Professor of Physics, UMass Lowell and Director, Submillimeter-Wave Technology Laboratory, (978) 934-1360, robert_giles@uml.edu.

Amherst Researcher Advises Governor on Climate Change

Professor Ray Bradley of Amherst, a paleoclimatologist and leading expert on climate change, briefed Governor Deval Patrick and other state officials earlier this year at a UMass Boston event that marked the Commonwealth's reentry into the Regional Greenhouse Gas Initiative. The Initiative commits the nine mid-Atlantic and New England states to cap carbon dioxide emissions from power plants and creates a market trading system for those emissions. Bradley and his colleagues created a reconstruction of temperature records over the last 1,000 years — known as the “hockey stick” graph — which details a sharp, recent rise in temperature resulting from human activity. This data is a key piece of supporting evidence in the policy debate over climate change. Bradley was recently honored for his work by the European Geosciences Union.

Contact: Ray Bradley, Professor of Geosciences, UMass Amherst and Director, Climate System Research Center, (413) 545-0659, rbradley@geo.umass.edu.

UMass Boston and Children's Hospital Boston Establish Youth Health and Fitness Research Center

Lack of appropriate physical activity and unhealthy eating among youth has resulted in a rapid rise in childhood obesity and an alarming increase in preventable illnesses such as type 2 diabetes and asthma. To address this, UMass Boston and

Children's Hospital Boston have established the Interdisciplinary Youth Fitness Research and Training Center, which aims to advance the science and clinical practice of improving youth health and fitness. The Center will provide a community-based resource where children, adolescents, and their families will receive guidance and support to achieve a physically active lifestyle that promotes optimal well-being. Through collaborations with industry partners, healthcare providers, and the Boston Public Schools, the center will address these issues on a systemic basis. The center seeks not only to become an important local resource for improving youth health and fitness, but also to serve as a replicable model nationally.

Contact: Kyle McInnis, Professor of Exercise and Health Sciences, UMass Boston and Director, Interdisciplinary Youth Fitness Research and Training Center, (617) 287-7495, kyle.mcinnis@umb.edu.

Dartmouth Launches Regional Bioengineering Research Network

The UMass Dartmouth campus hosted a two-day, regional conference on bioengineering and biotechnology earlier this year as part of its effort to expand relationships among the campus, other universities in the Northeast and the region's biotechnology industry. The event, funded by a grant from the President's Science and Technology Initiatives Fund, drew some of the best minds in biology, physiology, and engineering to exchange ideas and further collaboration. Student presentations at the conference covered topics that included tissue engineering, genetic engineering, biomaterials, and microfluidics. Featured speakers from Tufts University, Harvard

Medical School, the University of Washington, the University of Vermont, the University of California and Genzyme Corporation joined UMass faculty and representatives from Massachusetts General Hospital, the University of Rhode Island, Brown University and other regional institutions for the event.

Contact: Alex Fowler, Professor of Mechanical Engineering, UMass Dartmouth, (508) 999-8542, afowler@umassd.edu.

UMass Energy Working Group Established

With support of the Board of Trustees, the University has convened a system-wide faculty working group to undertake an assessment of current research and education activities in the area of renewable energy and energy efficiency and develop a strategy for advancing these programs. Chaired by Amherst Vice Provost for Research Paul Kostecki, the working group's efforts will build on notable strengths across the campuses, including mechanical engineering and information technology capabilities that support wind energy development, expertise in polymers and nanomaterials for solar and fuel cell technologies, and a broad array of interdisciplinary programs that further research and technology development in the emerging field of biofuels. The working group is expected to report to the Board in the fall.

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Technology Commercialization &

FY 2005 UNIVERSITY TECHNOLOGY LICENSING (DOLLARS IN MILLIONS)

Institution	Revenue
Emory University	\$585.7
New York University	\$133.8
University of California	\$92.9
Wake Forest University	\$49.9
University of Wisconsin	\$49.1
University of Minnesota	\$47.1
University of Florida	\$40.3
Massachusetts Institute of Technology	\$39.8
University of Rochester	\$30.5
University of Washington	\$29.3
University of Massachusetts	\$28.7
Harvard University	\$28.0
University of Colorado	\$27.4
Michigan State University	\$23.8
Eastern Virginia Medical School	\$20.3

Source: Association of University Technology Managers

UMass a National Leader in Technology Licensing Income

With \$28.7 million in licensing revenues, 2005 was another outstanding year in technology transfer for UMass, according to a recently released survey published by the Association of University Technology Managers. Along with MIT and Harvard, Massachusetts is home to three of the top academic institutions responding to the survey. Universities with income greater than \$20 million are shown in the sidebar.

Contact: Bill Rosenberg, Executive Director, Commercial Ventures and Intellectual Property, (617) 287-7186, wrosenberg@umassp.edu.

UMass Medical's Gene Silencing Technology Moves Toward the Market

In addition to advancing the science of RNA interference (RNAi) in its academic laboratories, UMass Medical School (UMMS) is expanding its industry partnerships to realize the potential of RNAi-based therapeutics. Sirna Therapeutics, a licensee of a number of key RNAi technologies from UMMS, was acquired last year by Merck & Co. for \$1.1 billion. Discussions with Merck are underway to explore ways to broaden the relationship. In addition, UMMS faculty members Craig Mello, Tariq Rana and Michael Czech are co-founders of a new company, RXi Pharmaceuticals, based in Worcester. Spun off from CytRx Corporation, another licensee of multiple UMass RNAi technologies, RXi will focus on developing RNAi-based therapeutics, initially for neurodegenerative diseases, oncology, type 2 diabetes and obesity.

Contact: Lisa L. Decker, Associate Director, Office of Technology Management, UMass Medical School, (508) 856-1626, lisa.decker@umassmed.edu.

Massachusetts Medical Device Development Center Wins State Grant

The John Adams Innovation Institute awarded a \$150,000 grant to the Massachusetts Medical Device Development Center (M2D2), a collaboration between UMass Lowell and UMass Medical School. The Center's mission is to help inventors convert ideas into prototypes to accelerate commercialization, and it brings together UMass Lowell's engineering expertise and the Medical School's clinical research expertise. The Center's long-term goal is to support 10 companies annually that go on to attract venture capital investment. The Center, one of several business initiatives directed by the University, has a steering committee comprised of executives from the medical device industry and venture capital firms.

Contact: Stephen P. McCarthy, Professor of Plastics Engineering, UMass Lowell and Co-Director, M2D2, (978)-934-3417, stephen_mccarthy@uml.edu.

Dartmouth ATMC Incubator Graduates Expand in SouthCoast

In late 2006, two start-up companies, with a combined \$3.9 million in revenues and 28 employees, graduated from the UMass Dartmouth Advanced Technology Manufacturing Center (ATMC) in Fall River and relocated to new facilities in southeastern Massachusetts. Micro-Ant, which designs

ENTREPRENEURSHIP

and manufactures state-of-the-art antennas, and Mikel Inc., which develops signal analysis software, both spent time turning their innovative technologies into growing businesses at the ATMC, a business incubator that is an economic development outreach unit of the University of Massachusetts. The ATMC provides start-ups with many keys to success including first-class office space and conference rooms, business advice and support, in-house prototyping and analytical labs, help finding funding and well-trained student interns. Currently, there are a number of other start-ups at the ATMC with an expectation of graduation within three years.

Contact: John Miller, Director of Operations, ATMC, UMass Dartmouth, (508) 910-9830, j2miller@umassd.edu.

Eight Researchers Receive UMass Technology Development Grants

Eight UMass researchers recently received Technology Development Awards of \$30,000 each from the Office of Commercial Ventures and Intellectual Property to advance the commercialization of their inventions. The type of research supported by the grants, such as proof-of-concept evaluation and prototyping, is often essential for attracting industry partners, but not usually allowable under federal grants. The new awardees are Susan Billings-Gagliardi, Medical School (interactive brain atlas project); Sumner Burstein, Medical School (anti-inflammatory therapeutics); Alex Fowler, Dartmouth (temperature control for transport of living cells); Stuart Licht, Boston (improved battery technology); Julian McClements, Amherst (encapsulation tech-

nology for foods); Melisenda McDonald, Lowell (protein-polymer substrates); Babs Soller, Medical School (non-invasive medical monitoring); and Sankar Thayumanavan, Amherst (nanoporous membranes for biosensors).

Contact: Bill Rosenberg, Executive Director, Commercial Ventures and Intellectual Property (617) 287-7186, wrosenberg@umassp.edu.

Four UMass Researchers Win MTTC Awards

The Massachusetts Technology Transfer Center (MTTC) announced earlier this year the results of its Fall 2006 technology awards competition. UMass researchers won four of the ten \$40,000 grants. The recipients are Om Parkash, Amherst (engineering of arsenic-free rice); Samson Mil'shtein, Lowell (high-performance electronic transistors); Arthur Watterson, Lowell (novel flame-retardant materials); and Robert Chen, Boston (development of a coastal bacterial sensor network). The grant program emphasizes technologies that could serve as the foundation for a start-up company or be commercialized by a Massachusetts industrial partner. MTTC is managed by the UMass President's Office to support academic technology commercialization and entrepreneurship across the Commonwealth. Proposals for the Spring 2007 solicitation are currently under review.

Contact: Abi Barrow, Director, Massachusetts Technology Transfer Center, (617) 287-7071, abarrow@umassp.edu.

MASSACHUSETTS TECHNOLOGY TRANSFER CENTER

CALENDAR OF EVENTS

June 22, 2007

Invention to Venture - Life Sciences

Harvard Medical School
Conference Center, Boston

August 1-4, 2007

Advanced Invention to Venture Waltham

October 2007

Invention to Venture UMass Dartmouth

October 29-30, 2007

Clean Energy Conference III Hynes Convention Center, Boston

December 2007

Nanotechnology Conference III Boston

DEVELOPING THE

Future Workforce

“UMass, with its five campuses and solid experience delivering online education, is uniquely qualified to model a new approach to e-learning that better serves local constituencies.”

— FRANK MAYADAS,
PROGRAM OFFICER
Alfred P. Sloan
Foundation and
President, Sloan
Consortium

UMassOnline Wins Sloan Foundation Grant for Blended Education Programs

UMassOnline has received a \$650,000 grant from the Sloan Foundation — a national leader in the promotion of online learning — to develop and deliver a new suite of educational programs that includes both online and face-to-face formats. Led by Dr. Jacquie Moloney, Dean of Continuing Studies and Corporate Education at Lowell and UMassOnline Executive-in-Residence, the proposal involves all five UMass campuses. With campuses across the Commonwealth, the programs emphasize the local advantage of the UMass system for continuing education. The first set of programs, to be offered in fall 2007, highlight the health-care professions and range from bachelor's degree completion to graduate certificates. A second set of programs is currently being identified for a 2008 launch.

Contact: Jacquie Moloney, Dean, Continuing Studies and Corporate Education, UMass Lowell, (978) 934-2943, jacqueline_moloney@uml.edu.

CITI a Key Partner in \$2 Million NSF Grant to Diversify IT Field

The Commonwealth Information Technology Initiative (CITI) is a UMass-led statewide partnership that promotes IT education across the K-20 curriculum in order to respond to state's technology workforce needs. With \$1 million of state support, CITI is now in its third iteration. UMass Amherst has leveraged this state support and secured a \$2 million NSF grant to create the Commonwealth Alliance for Information Technology Education, a new effort to attract more women and minorities into careers in IT and computing. It is one of eight such alliances across the country. Typical of CITI programs, this initiative is a collaborative effort of several institutions: UMass

Amherst, UMass Boston, Bristol Community College and Springfield Technical Community College.

Contact: Alana Wiens, Project Manager, Commonwealth Information Technology Initiative, UMass Amherst, (413) 577-4431, wiens@cs.umass.edu.

UMass Confucius Institute Opens at Boston Campus

As part of its international strategy, UMass has established a Confucius Institute at its Boston campus. The Institute was established in collaboration with Renmin University of China and its affiliated secondary school, with the sponsorship and authorization of Hanban, the China National Office for Teaching Chinese as a Foreign Language, under the Ministry of Education. The unveiling ceremony took place in November 2006, with Hanban Director General Xu Lin in attendance. The Institute was the sixth established in the U.S. and the first in New England. The Institute focuses on promoting Chinese culture and language and supporting local Chinese teaching in Massachusetts through teacher training and curriculum development, campus and community events, and the establishment of a clearinghouse of Chinese language and cultural materials. Through courses, conferences, travel, and cultural events, the UMass Confucius Institute will provide opportunities for cultural exchange and collaboration between the U.S. and China.

Contact: Allan Guo, Interim Director, or Baifeng Sun, Interim Associate Director, Confucius Institute, (617) 287-7291, baifeng.sun@umb.edu.

ECONOMIC ANALYSIS for the COMMONWEALTH

New Opportunities for the Merrimack Valley's Instrumentation Cluster

Working in partnership with the Merrimack Valley Economic Development Council, UMass Lowell Executive-in-Residence Ed March recently completed an analysis of the region's analytical instrumentation cluster, which includes over 150 companies located in 50 communities. While the sector's strengths have historically centered on process control and measurement equipment utilized by semiconductor and communications manufacturing companies, new business opportunities are emerging in support of medical device and pharmaceutical manufacturing. These opportunities are bolstered by a new U.S. Food and Drug Administration initiative emphasizing real-time process control to improve efficiencies and yields in drug and device manufacturing. A national conference of experts and industry leaders was held in Billerica recently to explore strategies for cluster growth and cross-sector collaboration.

Contact: Ed March, Executive-in-Residence, UMass Lowell, (978) 934-2982, edward_march@uml.edu.

Defense Technology Industry Study Underway

In collaboration with MassDevelopment, the UMass Donahue Institute is currently conducting primary research documenting the size, scope, and activities of defense technology sectors in Massachusetts. In addition, the Institute will prepare an estimate of the industry's impact on the Massachusetts economy. The final product will be a summary report of major findings for an audience of policymakers and opinion

leaders in Massachusetts. This report will include data and analysis of the key sectors in the cluster, employment and payroll in Massachusetts and competing states, contracts and related research awards, and the economic impact of the cluster's activity.

Contact: Rebecca Loveland, Research Manager, UMass Donahue Institute, (413) 545-0001, rloveland@donahue.umassp.edu.

Analysis of Biopharmaceutical Industry in Massachusetts Released

In collaboration with the Massachusetts High Technology Council, the UMass Donahue Institute conducted extensive research into a major component of the Commonwealth's life sciences industry cluster — the biopharmaceutical sector. The study revealed deep connections between biotechnology and pharmaceutical companies and highlighted the role that these strategic alliances play in funding new drug discoveries and supporting job growth in the state's life sciences cluster. While the sector has seen robust job growth over the past several years in Massachusetts, competitor states have had larger increases in employment. Key challenges were identified in the report, including enhancing K–12 science, technology, engineering and mathematics (STEM) education and ongoing workforce development, as well as improving business conditions and the regulatory environment.

Contact: Eric Nakajima, Senior Research Manager, UMass Donahue Institute (413) 545-0001, enakajima@donahue.umassp.edu.

Donahue Institute Study Offers New Planning Tool for Policymakers

The UMass Donahue Institute and Citizens' Housing and Planning Association released a new study that substantially advances public understanding of the fiscal impact of mixed-income homeownership developments in Massachusetts. The study, primarily authored by Senior Research Manager Eric Nakajima, revealed that many mixed-income housing developments (often called "40B" projects, after the state law that allows for expedited approval of affordable housing development) may have very limited impact on local schools or infrastructure. The study included an original approach to analyzing fiscal impacts, the fair share method, that may help municipalities and developers plan collaboratively with the state to design projects that gets affordable housing built without burdening town budgets.

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