

In brief

Economic Development



UMASS: AN EMERGING RESOURCE FOR THE COMMONWEALTH'S LIFE SCIENCES SECTOR

When Massachusetts had a defense- and computer-driven economy in the 1970s and 1980s, the University of Massachusetts forged long-term partnerships with firms such as Raytheon and Analog Devices. Similarly, when information technology transformed the state economy in recent years, UMass linked effectively with Fidelity, EMC, and PTC. All of these major employers remain our strong partners today.

Now, as the Commonwealth's economy is being transformed by rapid advances in the life sciences, the university is positioned to build on its past successes, expand its industry alliances, and serve as a full-service resource for new and growing firms in the biotechnology and medical device sectors in every region of the state. UMass has a variety of strengths in these sectors:

- In 2001, UMass graduated almost 600 students with degrees in the life sciences. Biology is now the leading major at the Amherst campus.
- Four UMass campuses — Boston, Dartmouth, Lowell, and Worcester — have recently developed M.S./Ph.D. degrees in biotechnology and biomedical engineering.
- UMass conducts more than \$250 million in research, over half of which is in the life sciences. The university ranks among the top 50 research universities in the country.
- Two UMass Medical School faculty members, both of whom are Howard Hughes fellows, rank among the world's top 10 for life science citations of their published articles.

- The medical school is expanding its commitment to conducting clinical trials, having recently negotiated agreements with firms such as Merck, GlaxoSmithKline, and Boehringer Ingelheim.
- The two largest new capital projects at UMass are in the life sciences — a \$120 million R&D center in Worcester and a \$80 million vaccine manufacturing plant in Boston.
- UMass now ranks 21st in technology licensing among US universities. The university has licensed its technology to such companies as Biogen, Sepracor, and Smith & Nephew.
- UMass Dartmouth and UMass Lowell each operate incubators that are positioned to serve life science start-ups such as AnVil, a bioinformatics company developed at Lowell.

The development of the life sciences, and keeping the related jobs and capital here in Massachusetts, have emerged as leading economic priorities for the Commonwealth. Commitment to high quality, responsive, and relevant academic programs and services in this fast-developing field, therefore, is a major goal for the Commonwealth's own university, the University of Massachusetts.

Sincerely,

William M. Bulger
President

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Conducting WORLD-CLASS

“Massachusetts medical device companies have long recognized the breadth and cutting-edge quality of research available at UMass.”

TOM SOMMER
President, MassMEDIC

New UMass Worcester Facilities and Programs Advance Life Sciences R&D

The newest research facility at the University of Massachusetts Medical School is the \$120 million Aaron Lazare Medical Research Building, a 360,000 square foot laboratory facility standing 10 stories high. As a state-of-the-art R&D center, the building holds the promise for significant advancements in infectious disease and cancer treatment, gene function and expression, neurobiology, biochemistry, and molecular pharmacology. The building is designed to house up to 100 scientists and their support staffs engaged in research across these areas. UMass Medical has already received top R&D rankings from the National Institutes of Health and *U.S. News & World Report*.

Contact: John L. Sullivan, Director, Office of Research (508) 856-1572

Worcester Scientists Among Most Cited in the World

Two of UMass Medical School's preeminent faculty were recently listed among the world's most highly cited scientists. Roger J. Davis, Ph.D. and professor of molecular medicine, conducts groundbreaking research on the body's cellular responses to environmental changes and their implications on a wide array of diseases. Michael R. Green, M.D. and director of the Program in Gene Function and Expression, studies a variety of subjects relating to the regulation of gene expression in eukaryotic cells. Davis and Green, both Howard Hughes Medical Institute Investigators at UMMS, were featured on the bio-

chemistry and biology ISI HighlyCited.com listing, newly created by the Institute for Scientific Information (ISI) to showcase some of the most influential international investigators.

Contact: Mark Shelton, Associate Vice Chancellor, University Relations (508) 856-2000

UMass Amherst Establishes Biopolymer Initiative

The Center for UMass/Industry Research on Polymers (CUMIRP) at UMass Amherst is forming an industry-sponsored research cluster focused on polymers in bio-related areas. The group will leverage the multidisciplinary backgrounds of faculty participants in combination with industrial applications. Polymer science has much to contribute in the areas of biotechnology, biology, and medicine. Many naturally occurring biomolecules are polymeric, and the interaction of synthetic polymeric materials and biological systems forms the basis for numerous medical advances, separations, diagnostics, sensors, delivery systems, and treatments. The biopolymer research cluster will complement CUMIRP's other industrial affiliate programs, currently attracting over forty corporations and government agencies to this world-class polymer research environment.

Contact: James Capistran, Director, CUMIRP (413) 577-1518

UMass Lowell Center Promotes Biomanufacturing

The Massachusetts Bioprocess Development Center at UMass Lowell helps biotechnology companies make the transition from research and development to the manufacture of biopharmaceuticals for the treatment of chronic diseases. The interdisciplinary R&D and education center assists start-up biotech companies in developing procedures that can become validated, compliant manufacturing processes. The center also acts as a test site for evaluating new process technology, helping high-tech equipment developers to improve their products. The center has worked effectively with Massachusetts firms such as Genzyme and Boston Life Sciences.

Contact: Carl Lawton, Director, Massachusetts Bioprocess Development Center (978) 934-3158

Biotech, an Emerging Focus for UMass Dartmouth Faculty

Professor of Mechanical Engineering Alex Fowler is developing a bio-engineered technique that could change the future of fabrics. Dr. Fowler has been working with a team from UMass Dartmouth and Harvard Medical School on a process to embed fabrics with a genetically engineered strain of the common E. coli bacteria. Applications for these bacteria-embedded fabrics exist in the medical and defense industries — with drug-producing bandages and protective clothing — and in commercial industry — with odor-eating fabrics. Meanwhile, biochemistry professor Bal Ram Singh is helping to combat bioterrorism by developing an antidote to botulism. Dr. Singh, who has

been researching botulism for 15 years, was awarded a \$1.1 million grant from the U.S. Army Medical Research and Material Command to conduct a three-year study. Botulism is caused by a bacterium that produces the most toxic protein known to humans. It attacks the nervous system and, if untreated, causes respiratory failure and death. It is classified as a Class A agent on the list of biological warfare threats.

Contact: Paul Vigeant, Assistant Chancellor for Economic Development (508) 999-9143

Amherst Awarded \$8.9 Million Bioremediation Grant by Department of Energy

University of Massachusetts Amherst microbiologist Derek Lovley has received an \$8.9 million, three-year grant to study a family of microbes with the potential for uranium bioremediation of soil, as well as the production of electricity. The grant, from the U.S. Department of Energy, is part of a larger \$103 million effort involving six national laboratories, 16 universities and research hospitals, and four private research institutes throughout the nation. UMass Amherst is the only public university to serve as a project leader in the effort. As Chancellor John Lombardi noted: "The substantial DOE commitment to this research reflects the remarkable achievements of Professor Lovley's work and the promise it holds for advances in energy production and environmental clean-up."

Contact: Derek Lovley, Professor of Microbiology (413) 545-9651

UMass Medical and UMass Memorial Partner with Merck for Vaccine Trials

Continuing its growth as a valuable partner to industry in conducting clinical trials, the University of Massachusetts Medical School, in conjunction with its clinical partner UMass Memorial Medical Center, was recently selected to participate in a multi-center trial of an experimental HIV vaccine. A product of one of the largest pre-clinical vaccine research programs in Merck & Co., Inc., history, the vaccine has been shown to prevent laboratory monkeys exposed to a virulent strain of HIV from getting sick. While the vaccine is primarily designed to prevent uninfected people from contracting HIV, the company says it also wants to test whether the vaccine can be used to treat people already infected with the AIDS virus, an experimental concept that is attracting much scientific interest.

Contact: Sheila Noone, Director of Clinical Trials (508) 856-5015

PROVIDING THE Industry's Future Workforce

"The new M.S./Ph.D. program is vital to ensuring that UMass students and the Commonwealth are prepared to harvest the fruits of the biotechnology orchard that have ripened before our eyes in the past five years."

MICHAEL J. MORIN, PH.D.
Executive Director,
Cancer Drug Discovery,
Pfizer Global R&D and
UMass Lowell Alumnus

New Multi-Campus M.S./Ph.D. Degree Program in Biomed and Biotech

UMass is launching a new program that joins the Boston, Dartmouth, Lowell, and Worcester campuses to offer an M.S. and a Ph.D. in biomedical engineering and biotechnology. Developed under the guidance of faculty across the system, as well as input from industry, the new degree will maximize the resources of the four campuses to develop a program uniquely situated at the intersection of biology and engineering. The multidisciplinary program will leverage the university's broad expertise in these areas and respond to the growth of the biotech and biomedical industries in Massachusetts. Graduates of the program will fill much-needed positions in the growing life sciences industry while contributing to solutions for contemporary biomedical and health research problems.

Contact: Bryan Buchholz, Director, UMass Biomedical Engineering & Biotechnology Program (978) 934-3241

Amherst Students Becoming a Force in the Life Sciences

Undergraduate interest in the life sciences is growing apace with the state's concentration of biomedical research. In 2001-2002, over 1,000 UMass Amherst undergraduates were majoring in biology, making it the most popular major on campus. With a total of 1,700 undergraduates and 250 graduate students studying the life sciences, UMass Amherst is an important source of biotech knowledge workers. Undergraduates in a unique interdisciplinary program work with faculty sponsors to design bachelor's degree programs with individual concentrations in biomedical science, biotechnology, bioinfor-

matics, and biotechnology administration. Students complete core courses in math and physical sciences, life sciences, computer science, business, and electives intended to provide a strong foundation of knowledge and technical proficiency. At the graduate level, UMA's program in molecular and cellular biology is considered to be in the top 30 percent nationwide by the National Research Council. UMA is a valuable hiring resource for leading companies such as Biogen, Genzyme, Wyeth Biopharma, Astra-Zeneca, BASF, and Solutia.

Contact: Frank Cannon, Professor, Biochemistry and Molecular Biology (413) 577-2250

UMass Boston Alumnus at Pfizer Supports UMB Students

Alumnus Berkeley "Buzz" Cue credits the faculty at UMass Boston for influencing his current success by helping him select a career path based on the field of chemistry. Cue currently serves as vice president for pharmaceutical sciences with Pfizer Global Research and Development, located in Groton, CT. He defines drug development strategies and manages components of Pfizer's R&D, regulatory affairs, and business operations. His division is responsible for such revolutionary drugs as Zithromax, an antibiotic; and Zoloft, a treatment for depression and obsessive-compulsive disorder. Cue is giving back to the university by serving on the Science Advisory Board, endowing a \$100,000 scholarship for chemistry fellowships, and promoting collaboration between UMass Boston and Pfizer to increase students' awareness of the pharmaceuticals industry.

Contact: Christine Armet-Kibel, Dean of the Faculty of Sciences (617) 287-5777

COMMERCIALIZING Life Sciences Technology

UMass Ranks #21 in Technology Licensing in the United States

According to the most recent data published by the Association of University Technology Managers, UMass now ranks 21st among American research universities in the amount of income received from technology licensing. UMass achieved this level of national distinction by earning over \$9 million from its licenses in FY 00. Licensing income has continued to grow, topping \$12 million in FY 01 and \$15 million in FY 02. Licensing at UMass is administered by the Office of Commercial Ventures and Intellectual Property (CVIP), established by President Bulger in 1996.

Contact: William Rosenberg, Executive Director, Office of Commercial Ventures and Intellectual Property (617) 287-7186

Path-breaking Gene Silencing Technology Licensed by UMass Worcester and Collaborators

Two of UMass Worcester's outstanding research faculty, Craig Mello and Philip Zamore, have been leaders in the important scientific area of double-stranded RNA inference. This technology can stop genes from being activated and thus has a wide range of potential applications in healthcare. Mello, a Howard Hughes Fellow, and Zamore have been key researchers in UMass research collaborations with the Carnegie Institute and MIT. These collaborations have resulted in numerous invention disclosures, several patents, and more than a dozen licenses to life science firms around the world. The importance of this technology was recently cited in a feature article in the *Wall Street Journal*.

Contact: Joseph McGuirl, Director, Worcester CVIP (508) 856-1626

Successful Bioinformatics Spin-off from UMass Lowell

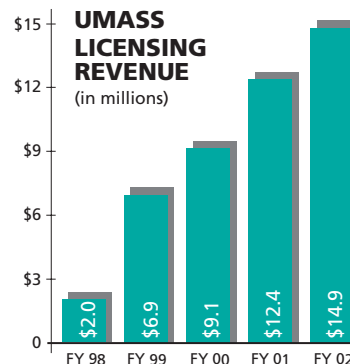
AnVil Bioinformatics, founded in 1999, was established around technology developed by Professors Georges Grinstein, Haim Levkowitz, and Kenneth Marx at UMass Lowell and licensed from the university. This company specializes in data visualization for bioinformatics. Originating at Lowell's high-tech incubator, it secured two rounds of private financing and signed up a number of key clients, then "graduated" to a location in Burlington. The company, now employing about 25, was recently profiled in the business section of the *Boston Globe*. The university owns equity in AnVil, maintains a productive research partnership with the company, and will receive royalties on the sale of its technology.

Contact: Louis Petrovic, Director of External Funding, Technology Transfer, and Partnering, UMass Lowell Research Foundation (978) 934-2577

Another Record-breaking Year in Technology Commercialization

UMass recently completed another record-breaking year for commercializing its technology. During FY 02, the university executed 20 licenses and generated revenue just shy of \$15 million — the highest total in its history. During the past year, the university also generated over 100 faculty invention disclosures, filed over 70 patent applications, and had more than a dozen patents issued. The majority of the inventions, patents, licenses, and income generated by CVIP in FY 02 was in the field of life sciences. (See graph for a historical comparison of licensing revenue over the past five years.)

Contact: William Rosenberg, Executive Director, Office of Commercial Ventures and Intellectual Property (617) 287-7186



Supporting REGIONAL DEVELOPMENT of the LIFE

UMass Medical Center Anchors Biotech Park for Worcester

The UMass Medical Center originally helped in the creation of the Massachusetts Biotechnology Research Park by donating the land on which the park was built. Today, UMass Worcester serves as the university anchor for the park. It has developed countless university/industry relationships that help attract and retain companies in what has become one of the nation's leading centers for biotechnology and medical devices. These relationships have ranged from joint research partnerships and commercialization of university technology to joint scientific appointments and sharing of facilities and libraries. There are no fewer than 20 life sciences companies and 1,500 employees currently operating at the Biotech Park, which covers 800,000 square feet and represents a \$250 million infrastructure and investment. Abbott Laboratories is the park's leading private employer, with 700 employees.

Contact: Richard Stanton, Deputy
Chancellor (508) 856-5120

Mass Biologic Labs Expanding in Boston

UMass partnerships are helping the city of Boston to strengthen its position as a home for biotechnology and life science initiatives. The Massachusetts Biologic Laboratories (MBL), a unit of the University of Massachusetts Medical School, is preparing for expansion into a new \$80 million, 80,000-square-foot facility on the grounds of the old Boston State Hospital in Mattapan. MBL's existing facility in Jamaica Plain, in operation for over 100 years, currently serves as the only publicly operated FDA-licensed vaccine and biologics manufacturing facility in the country. The expanded infrastructure will enhance MBL's capacity to develop, manufacture, and fill products, including vaccines, monoclonal antibodies, and recombinant proteins. Significantly, the new facility will better position the MBL for future development and manufacturing of "orphan" products — those providing life-saving treatment for limited populations affected by rare diseases. Groundbreaking is scheduled for later this year, with plans to open in 2005.

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Chancellor (617) 983-6218

UMass Incubators Offers Support for Life Sciences in the South Coast and the Merrimack Valley

In recent years, the university has established two professionally managed high-tech incubators. Both provide start-up companies with affordable space, high quality professional services, links with sources of capital, and access to university facilities and resources. The first, established in 1999, is the Commercial Development Center at UMass Lowell. It currently houses five technology-based companies and has seen several firms "graduate" from the incubator and establish permanent homes in the region. One of these is AnVil Informatics, which has set up permanent operations in Burlington. The second incubator, housed at the Advanced Technology Manufacturing Center in Fall River, was developed by UMass Dartmouth earlier this year. In just a few short months, it has already attracted three diverse advanced manufacturing firms.

Contacts: Louis Petrovic, UMass Lowell
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*“UMass is assuming an ever-greater leadership role
in the emergent growth industry of biotechnology.”*

JANICE BOURQUE, President and CEO, Massachusetts Biotechnology Council

SCIENCES

UMass/Baystate Alliance to Power Life Sciences in Western Mass

Since 1995, the joint UMass/Baystate Medical Center Collaborative Biomedical Research (CBR) program has joined students, faculty, and clinicians to pursue disease-related research and training in western Massachusetts. The CBR program offers four components: research projects where faculty from both institutions collaborate on research initiatives that merge basic and clinical interests; a biomedical scholars program for graduate students and residents to obtain research training; summer internships for undergraduates to gain valuable hands-on experience; and a molecular medicine course that integrates basic and clinical insights into the study of human disease. The program is a valuable resource for growing biotechnology enterprises in the region. The seed grant program has funded \$1 million in cumulative awards, which have in turn attracted over \$3.3 million of extramural grant awards. Currently 55 UMass Amherst faculty from 16 departments participate in the interdisciplinary program, complemented by 29 Baystate Medical researchers in 19 hospital departments.

UMass Amherst and Baystate recently joined forces to create the new Pioneer Valley Life Sciences Institute, beginning with a 40,000-square-foot biomedical research and office facility in Springfield. The city, state, and federal governments are actively supporting this initiative.

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This and past issues of *In Brief*
can be found on the Web at
www.umassp.edu/econdev/inbrief

Upcoming Events

October 30 7:30 AM to 9:30 AM Burlington Marriott, Burlington, Mass.

UMass Life Sciences Breakfast

Please join UMass President William M. Bulger to learn more about the breadth of expertise and services the University of Massachusetts has to offer the life sciences industry. This event, co-sponsored by the Massachusetts Biotechnology Council and MassMEDIC, will be a unique opportunity to learn more about how your state university and industry can work together, strengthening the Commonwealth's leadership position in the life sciences.

**For more information, contact Kathleen Phalen,
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**Ground-breaking life
sciences research**

**Internationally recognized
faculty**

**World-class R&D facilities
throughout the
Commonwealth**

**Specialized degree programs
in the life sciences**

**Demonstrated ability to
commercialize technology**

