UMass Lowell will be the first public university in Massachusetts to offer graduate degrees in pharmaceutical sciences.

New Pharmaceutical Sciences Programs Approved

First Public University in State to Offer Graduate Degrees in Growing Field

With an eye on the growing demand for pharmaceutical scientists, UMass Lowell is set to offer graduate programs in the trending field—becoming the first Massachusetts public campus to do so.

The Massachusetts Board of Higher Education recently approved new master’s and doctoral pharmaceutical sciences programs at the campus; classes will begin in September 2014 with affiliated faculty from the UMass Medical School.

By establishing these programs, UMass Lowell fulfills a vital workforce need in the high-tech biopharmaceutical industry. Federal and state data projects a 17 percent growth rate in the pharmaceutical industry through 2018, but Massachusetts faces national and global competition to fill the jobs created by expansion of the industry.

Pharmaceutical scientists discover, develop, test and manufacture medications. UMass Lowell will offer master of science and doctoral degrees along with a professional science master’s degree.

The professional science master’s program will provide a core of business fundamentals—such as finance, marketing and management—as well as courses in technical communication and pharmaceutical science. Valuable hands-on experience will be offered through co-op placements.

Students in the Ph.D. program will have a choice of six research specializations: clinical research, drug discovery, medicinal chemistry, nanopharmacology, nuclear pharmacology and imaging, and pharmacogenomics.

“Because of its existing programs in nanotechnology, clinical laboratory sciences, genomics and chemistry, UMass Lowell is in a unique position to prepare students for both research and leadership careers developing new methods of drug discovery and delivery,” says Shortie McKinney, dean of the University’s College of Health Sciences.

More than 30 faculty members from across UMass Lowell in various academic disciplines—biology, chemistry, clinical laboratory sciences, engineering, nutritional sciences and physics—will teach in the program. About 25 affiliated faculty from UMass Medical School in Worcester with expertise in the areas of biochemistry, molecular medicine and neurology will be among the possible mentors for Ph.D. research students.
Manning School Launches Ph.D. Program

Business Program Emphasizes Advanced Research

There has been a high level of interest in the new Ph.D. program in UMass Lowell's Manning School of Business. There were 60 applicants for the first semester, which exceeded expectations, says Scott Latham, associate dean of the Ph.D. program.

The 12 students who are enrolled this semester come from eight different countries, including Turkey, Saudi Arabia, China, India and Vietnam. Students choose from concentrations in accounting, finance, technology management, management information systems and leadership.

With an emphasis on advanced academic research, the doctoral program is elevating the profile of the Manning School.

“There’s a huge difference in being a Ph.D.-granting institution,” says Latham. “It’s about being a thought leader.”

To support a doctoral program, the Manning School has recruited several new faculty members and invested in tools such as Wharton Research Data Services, which provides online access to key financial, economic and marketing data. The school has also established a Research Advancement Committee as a forum where faculty and Ph.D. students can exchange ideas and get input on projects.

Students Explore Electronics with ‘Lab in a Box’

Electrical, Computer Engineering Majors Put Theory into Practice

As they push through first-year classes in calculus, physics and engineering theory, freshmen engineering majors sometimes forget that the end result of those classes is the fun stuff: the ability and opportunity to design new products and processes.

But thanks to new Lab in a Box learning kits, freshmen in the electrical and computer engineering program are getting hands-on training and design experience much sooner in their college careers.

Erin Webster, a recent computer engineering graduate and teaching assistant, worked with Prof. Jay Weitzen and technology companies Analog Devices and Digilent to create the kits.

“We need to provide engineering students not only with math, physics and engineering theory, but also significant hands-on laboratory and open-ended design experiences so they are ready for high-technology jobs of the 21st century,” says Webster, whose work has been featured in Forbes, Electronic Design and Planet Analog.

Lab in a Box consists of an Analog Discovery module that connects to a PC via a USB drive and functions as an oscilloscope, waveform generator, logic analyzer, voltmeter and power supply. The kit also comes with a Parallax microprocessor board; basic electronic components such as resistors, capacitors and LEDs and the software to run everything.

“This is not a virtual lab,” explains Weitzen. “This is a real, working electronics lab. Students build basic circuits, collect analog and digital data and analyze the results.”

"Lab in a Box costs about the same as an engineering textbook, and it allows students to take as much time as they want to do the experiments," says Webster. “Students need interesting, fun and challenging hands-on projects to keep them engaged and enthusiastic about engineering.”

University Composts Dining Hall Food

Pilot Boosts Campus Sustainability

Under a pilot program introduced this fall at Fox Hall's Dining Commons, table scraps and food waste are being collected, pulped and transported to a local farm for composting. In September, an average of 526 pounds of food waste was readied for composting each day, for a total of 15,780 pounds, or nearly eight tons for the month. In October, an average of 660 pounds per day was readied for composting—nearly ten tons for the month.

“This is a model program for higher education,” says Richard Lemoine, director of environmental and emergency management.

“It’s part of our effort to be a leader in sustainability and energy conservation.”

Composting food waste reduces the need for chemical fertilizers, cuts back on methane production in landfills and diverts organic materials from the waste stream.

The composting program requires no change in routine for students: They put their plates and cups on the “Dish Drop” conveyor as usual. Kitchen workers scrape any remaining food into a chute that carries the waste to a pulper. The material is then stored in bins for about eight months, when a nutrient-rich material results that can be added to soil or used as a growing medium for plants.

Working with Prof. Jay Weitzen, computer engineering graduate Erin Webster has developed “Lab in a Box,” a complete, low-cost electronics workbench that is portable and flexible.
## History Center

More than 60,000 students who take part in Lucie Foundation Honors Arno Minkkinen Sustainability Launched at Tsongas Industrial Workshop

But for the Finnish-born photographer, being selected as the Lucie Foundation’s 2013 honoree for achievement in fine art was something special.

“It was one of the proudest moments of my artistic life,” says Minkkinen. “You don’t apply, you don’t even imagine—it just drops out of the sky. It’s not about money or fame; it’s just about the work. And knowing folks who got it, I would never imagine the shiny thing would one day come my way.”

## Who Says Learning Can’t Be Fun?

### Engineering Workshop Launched at Tsongas Industrial History Center

As a life and physical sciences middle school teacher, Jennifer Curley is always searching for new ways to help her students understand tough concepts.

“Potential and kinetic energy are very abstract concepts for students but when they can see how a water turbine works at the Tsongas Industrial History Center, it brings those ideas to life,” says Curley, a science education student in the Graduate School of Education.

The Tsongas Industrial History Center—host to more than 60,000 students who take part in hands-on workshops and tours of Lowell National Historical Park’s resources annually—recently launched its newest workshop called “Engineer It!”

Designed for students in grades 3 to 12, “Engineer It!” combines history and engineering as students explore the Industrial Revolution. Working in pairs, students use the engineering design process in a design-and-build challenge using plastic building pieces that connect with metal bolts, nuts and L-brackets. They use simple machines including an inclined plane, a pulley and wheel and axle that mirror complex machines in the city’s many gatehouses, which students also visit.

The “Engineer It!” workshop helps reinforce student learning as state standards place an increased emphasis on engineering.

Curley says: “We don’t have a lot of resources in middle school education to teach engineering, so this workshop really helps fill that void."

The Tsongas Industrial History Center is a partnership between the UMass Lowell Graduate School of Education and Lowell National Historical Park.

### Energy and Sustainability Manager Wins Leadership Honors

Paul Piraino, energy and sustainability manager at UMass Lowell, was lauded recently by the state’s Secretary of Energy and Environmental Affairs with a Leading by Example Award. One of only 10 honorees in the state, Piraino was commended for his energy efficiency efforts, including upgrades to building controls and HVAC systems, as well as for his role in forging a net metering agreement with Westford Solar, a pact that will result in significant energy savings for the University.

Since coming to UMass Lowell in 2011, Piraino has spearheaded campus energy efficiency efforts and is coordinating the University’s Climate Action Plan, which addresses climate change through research, education and outreach and commits the campus to carbon neutrality by 2050.

“Paul’s leadership and enthusiasm have put UMass Lowell in the forefront of sustainable energy initiatives, says Thomas Dreyer, associate vice chancellor for facilities management.

Since energy conservation measures were introduced in 2010, the University is saving approximately $2.4 million annually in energy costs, or about $204 per each full-time student.

Piraino’s award marks the second consecutive year that the University has been cited in the Leading by Example awards. In 2012, UMass Lowell was honored for outstanding energy and environmental leadership.
DifferenceMakers Win Awards for Innovative Prosthetic Limb

When the DifferenceMaker program launched on campus last year, it was just an idea: Bring students, faculty and alumni together to explore real-world problems and work together to create solutions.

Already, that idea is giving birth to concrete innovations and remedies.

Case in point: Nonspec is a company started this year that aims to make a difference by fabricating low-cost, durable prosthetic limbs for children in developing countries.

“We have designed and built replacement limbs that are highly functional and can be customized to fit young users,” says Nonspec CEO Jonathan de Alderete, who graduated this year with a bachelor’s degree in mechanical engineering and is now enrolled in the master of science in innovation and technological entrepreneurship program.

“In war-torn regions of the world, the leading causes of loss of limb or amputation are land mines, terrorist bombings, accidents and the lack of basic public health, which often leads to infection and gangrene.

According to a 2006 report published by the American Academy of Orthotists and Prosthetists, a traditional prosthetic limb made in a developing country can cost up to $1,900 apiece, and children can go through 25 limbs or more in their lives.

“This presents a major problem since the average family income in rural areas is typically around $300 annually,” the report states.

Nonspec’s goal is to mass-produce replacement limbs that anyone can afford—the team estimates the cost per unit of its device to be $20 for 20,000 units. Using an innovative telescoping system of thermoplastic rods, the students designed the limb to be “growable,” or scalable.

“This means children in developing nations need to change their prosthetics fewer times throughout their childhood, allowing them to develop their muscles regularly and, overall, enjoy a more normal, active and hands-on life,” says de Alderete. “Our product can also be adjusted for adult clients as a lifelong product.”

“From the beginning, the Nonspec team showed dedication and enthusiasm by attending each DifferenceMaker educational workshop and event,” says Assoc. Prof. Steven Tello, associate vice chancellor for entrepreneurship and economic development.

In April, Nonspec participated in the first annual DifferenceMaker Idea Challenge, where it received the prestigious title “Campus-wide DifferenceMaker,” along with the top prize of $5,000. The funds allowed the team to create its first batch of prosthetic arms.

“With a projected 15 percent market share in the next five years, our company plans to use this market presence to launch a foundation called ‘Give a Hand,’” says Erin Keaney, co-founder and vice president of Nonspec.

Following its success in the Idea Challenge, the team went on to win first-place honors and $1,000 in cash during the International Association of Plastics Distribution’s “Plastics Application Design Competition,” held in October in Miami.

Entrepreneur Magazine has also recognized the team’s mission by selecting it as one of the top 10 semi-finalists in the publication’s “College Entrepreneur of 2013 Contest.”

In addition to Keaney, members of the team include mechanical engineering graduate students Katherine Cain and Olivia Keane, co-op student Brendan Donoghue and MBA student Tucker Holladay.