Over the past decade, nanotechnology has become an important tool in the fight against breast cancer. Using nanoparticles measuring only billionths of a meter in size, doctors are able to deliver drug molecules directly to the affected tissue.

In an effort to improve the success of this new tool, chemical engineering Asst. Prof. Prakash Rai has been awarded a grant by the National Cancer Institute at the National Institutes of Health totaling more than $725,000. Rai will study a combined, nanotechnology-based diagnostic/therapeutic strategy for the targeted treatment of two subtypes of breast cancer: the human epidermal growth factor receptor 2 positive (HER2+) and the triple-negative breast cancer (TNBC).

“HER2+ and TNBC are among the most difficult types of breast cancer to treat, with resistance to primary treatments a major issue in patients with recurring disease,” notes Rai.

Breast cancer is one of the leading causes of cancer deaths among women in the United States. In 2013 nearly 231,000 women were diagnosed with the disease and close to 41,000 died from it, according to the U.S. Centers for Disease Control and Prevention. “There is a dire need for better, more effective treatments with lower side effects,” says Rai.

Theranostics, a combination of therapeutics and diagnostics, is a relatively new field in medicine that helps doctors decide the best therapy to prescribe for each patient. Instead of a broad, generic approach to treatment, this personalized medicine ensures the patient will receive only the drug needed, thereby maximizing the therapeutic benefits while minimizing unwanted adverse side effects.

Rai and his research team combined several therapeutic agents that have shown potential in cancer treatment into a single nanometer-sized targeted drug-delivery platform—called a “theranostic nanoconstruct,” or TNC—and tested the nanoplatform’s treatment effectiveness in lab mice.

“The combination of these therapeutic agents with an imaging agent into one TNC helps reduce the dose required in a patient to achieve efficacy, thus reducing the toxic side effects,” explains Rai. He says the imaging agent helps the team locate the TNCs and track them after they have been injected into the body, leading researchers to the cancerous tissues.
Women MBA Students Begin New Chapter

Manning School Joins National Association, Opening Doors for Networking and Mentorship

MBA student Marcie Byrd doesn’t have to look far to find female role models in leadership positions. Jacquie Moloney is her university’s first female chancellor. Sandy Richtermeyer is her business school’s new dean. Leticia Porter is her school’s director of graduate programs.

Byrd, a part-time MBA student who has worked in the university’s Information Technology department for the past 14 years, has now taken on a leadership position of her own, serving as president of the Manning School of Business’ new chapter of the National Association of Women MBAs. With 72 student chapters and 18 professional chapters across the country, NAWMBA is a nonprofit organization dedicated to advancing female business professionals and enhancing workforce diversity.

And, contrary to its name, it’s not just for women.

“It’s for everybody who’s committed to diversity and advancement in the MBA-related professions,” says Richtermeyer, who made establishing an MSB chapter an early priority as dean. “It’s an important way to bring our MBA students together and build a community.”

Membership is free and open to all of the roughly 600 students currently pursuing a master of business administration degree, either on campus or online. Alumni of the MBA program are also welcome to join.

History Students Create Learning Tools

‘Browsing through Birke’s’ Speaks to Genocide Trauma

History is alive in the people around us.

That’s what history majors Autumn Sacramone ’17 and Suzanne St. Peters ’16 discovered when they went beyond the classroom to become practicing historians.

They created a study guide for the Tsongas Industrial History Center to accompany the 1996 documentary “Browsing through Birke’s,” which portrays two Holocaust survivors, Nathan and Sally Birke, and their business in downtown Lowell, Birke’s Department Store.

The web-based study guide includes historical photos, information about the film and the filmmaker, written historiographies and oral histories of survivors of the Holocaust and the Cambodian and Armenian genocides, questions for discussion, suggestions for teachers and links to other educational resources.

Nathan Birke had a reputation as a curmudgeon who would throw people out of his store for being too picky. He also lectured customers on the horrors of the Holocaust and displayed articles and photos about it on the store’s walls.

Sally Birke, on the other hand, greeted customers with homemade treats, coffee and tea. She appears in the documentary, as does the Birkes’ daughter Szifra, who helped Sacramone and St. Peters with their study guide.

University Assesses Health Needs in Greater Lowell

Students Get Hands-On Community Health Research Experience

University students and faculty researched the health needs of Lowell and surrounding towns—and found some surprises.

On most measures of overall health—diabetes, high blood pressure, asthma and heart disease—Lowell residents, who have lower incomes and other barriers to health care, are worse off than residents of Billerica, Chelmsford, Dracut, Dunstable, Tewksbury, Tyngsboro and Westford.

But residents of the surrounding towns have higher rates of obesity and cancer than city residents, says Economics Research Prof. David Turcotte, who led the 2016 Community Health Needs Assessment. And a shortage of addiction treatment and mental health services, especially coordinated care for people suffering from both, is an area wide problem.

Lowell General Hospital, now part of Circle Health, must complete the state-mandated assessment every three years and contracted with UMass Lowell to conduct it. The assessments are done in partnership with the Greater Lowell Health Alliance, and local health care executives and nonprofits use the findings to improve care and community interventions.

The assessment released this fall looks at state health data, economic and housing data, interviews with key informants and issues identified by 16 focus groups.

The health issues topping this year’s list of concerns were mental health and diabetes. Participants cited a lack of mental health services for women, children and the elderly, as well as limited sources of healthy, affordable food in the city.

Addiction and substance abuse were also a major concern: Opioid overdoses have surged since the last assessment, and wealthier suburban communities are not immune, Turcotte says.

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New Biomedical Engineering Degree Program Offered for Undergraduates

Goal: Develop Workforce for the State’s Growing Medical Device Industry

Massachusetts, home to more than 400 medical device companies, is a leader in the growing medical device market and is the second largest employer in the industry, behind only California. Medical devices include artificial organs, orthopedic implants, artificial limbs, pacemakers, infusion pumps, corrective lenses, ear and dental implants, heart-lung and dialysis machines, biomedical imaging equipment and much more.

In support of this important sector of the economy, the Francis College of Engineering has launched a biomedical engineering undergraduate bachelor’s degree program this fall, the first offered by a public university in the Commonwealth.

“The four-year program is designed to prepare students to enter the workforce for designing and manufacturing medical devices while complementing other statewide efforts in bioengineering, which currently serve the pharmaceutical and biopharmaceutical industries,” says plastics engineering Prof. Stephen McCarthy, the program’s director. A Department of Biomedical Engineering will be housed at Perry Hall on North Campus. The four-story building, which first opened in 1952, is scheduled to undergo major interior and exterior renovation starting next year. A total of nearly 12,000 square feet of brand-new research and teaching labs, offices and common collaborative spaces has been designated for BME workforce development.

Crowdfunding Comes to UMass Lowell

Small Donations Add Up for Scholarships, Vet Services, the String Project and Hawkapella

Sometimes the best way to stand out in the crowd is to join one.

In November, the Office of University Advancement launched its first-ever crowdfunding campaign. The goal: Use social media to raise funds for four worthy projects—a new scholarship honoring Larry Siegel, associate vice chancellor for student affairs; funding for Veterans Services; a documentary celebrating the UMass Lowell String Project; and a five-song EP by Hawkapella, the university’s all-male a cappella group.

“People believe in UMass Lowell, and crowdfunding makes it fun and easy for them to show support,” says Theresa Lee, executive director of annual giving. Partnering with GiveCampus, a secure crowdfunding site that specializes in academic institutions, “means our donors can learn more about these projects, make a gift and then spread the word on social media,” she says.

In short order, donors have contributed more than $6,000 to the four campaigns. Lee says the university will add new projects throughout the school year.

To join the crowd, visit www.givecampus.com/schools/UniversityofMassachusettsLowell.

Is There Anybody Out There?

Private Telescope Will Search for Habitable Worlds in Alpha Centauri

Before NASA’s Kepler mission was launched in 2009, nobody knew for sure if Earth-like planets capable of sustaining life were common across the universe. Since then, Kepler has discovered thousands of small, rocky planets orbiting sun-like stars, some of which are located within the “habitable zone,” where water could exist in liquid form on the planet’s surface.

Thanks to recent technological breakthroughs in exoplanet research, scientists now have the capability to take the first direct picture of an alien Earth-like planet beyond our solar system.

Project Blue, a consortium of non-governmental, non-profit space and research institutions, has embarked on an ambitious quest to design, build and launch by 2020 a small, lightweight, privately funded space telescope to detect planets around our nearest stellar neighbor, called Alpha Centauri.

The team is led by Jon Morse, former NASA director of astrophysics and the CEO of the BoldlyGo Institute, while physics Prof. Supriya Chakrabarti is the principal investigator for UMass Lowell. Chakrabarti, who directs the university’s Lowell Center for Space Science and Technology, is providing technical expertise in the design and fabrication of the telescope.

The project is being funded by contributions from the space industry, government agencies, academia and the general public.

Alpha Centauri lies 4.37 light years from Earth. The star is actually a binary system, containing not just one but two stars similar to our sun that are designated as Alpha Centauri A and B. The star system was selected as the mission’s target because of its close proximity.

“This would be our very first view of another world like our own,” says Chakrabarti. “And it would change forever our understanding of our place in the universe.”

Project Blue scientists are building a space telescope to look for Earth-like planets around the star system Alpha Centauri. This photo of our home planet was captured by the crew of Apollo 17 on its way to the Moon in 1972.
eNABLE Lowell Creates 3-D Printed Artificial Hand For 8-Year-Old

Liam Haggerty is a typical 8-year-old boy: curious, independent and full of energy. The third-grader from Eliot, Maine, likes Captain America, Optimus Prime and Leonardo from the Teenage Mutant Ninja Turtles.

“Liam loves to ride his bike, play soccer and go snowboarding,” said his mom, Misty. “He also wants to be able to play basketball and baseball like his classmates, but he couldn’t. Liam was born with a physical deformity, leaving his left hand with a small thumb and undeveloped fingers.”

Thanks to the efforts of eNABLE Lowell, an all-volunteer student chapter that designs and fabricates low-cost, 3-D-printed prosthetic devices for children with physical disabilities, Liam’s wish is finally coming true. On Oct. 29, students from the eNABLE Lowell group fitted Liam with a custom-made artificial hand at the South Campus basketball court. After a few quick adjustments, he started playing hoops right away, dribbling and shooting with gusto. He even scored a couple of baskets.

“It’s really awesome!” exclaimed Liam. “I can’t wait to show my cool new toy to class.”

“The smile on his face was better than Christmas morning,” Misty said. “We’re so grateful to the students of UMass Lowell for putting Liam on an even playing field, for making dreams come true for us. This is going to open up a whole new world of possibilities for him.”

According to Craig Kelly, a mechanical engineering junior and the vice president of eNABLE Lowell, a child can go through as many as a dozen artificial hands by the time he or she turns 18. “Traditional prosthetic devices can cost around $1,000 to $2,000, and up to $10,000 or more for high-tech models,” he notes. “It becomes a huge financial burden to the family.”

The goal of eNABLE Lowell is to provide prosthetic devices free of charge through fundraising and sponsorships. In November 2015, the group conducted an online fundraiser with families, friends and social media and was able to raise $1,200. It also won a total of $7,500 in cash prizes from the DifferenceMaker contests. The Francis College of Engineering provides the group with free access to the MakerSpace3D printers and workstations.

Peter Larsen, who earned a bachelor’s degree in biology from UMass Lowell in May and is now pursuing graduate studies in biotechnology and public health, founded eNABLE Lowell in 2015 together with Kelly and Kreg Kaminski ‘16, an intern at the Massachusetts Medical Device Development Center. The group is part of an international organization called eNABLE Community Foundation.

Alex Lambert, a senior plastics engineering student, leads the design team for eNABLE Lowell. The group created two devices for Liam: an all-black Ninja Warrior hand, based on an open-source design from the eNABLE Community Foundation, that can grasp and manipulate objects, and a “Spock” hand with the fingers in a Vulcan salute to help Liam dribble the ball.