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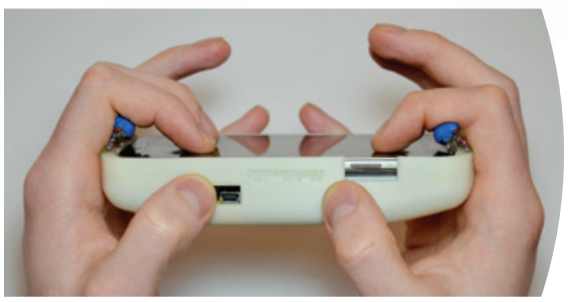

Cell phone accessibility will soon have new meaning for the nearly 285 million visually impaired people who struggle with sending and receiving information. **Page 5**

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Doing business in Vietnam

RIT's Executive MBA students gained international experience traveling to Southeast Asia's newest hot spot for business and entrepreneurship. **Page 9**

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Classes are filling up with students eager to learn about style and flair from one of the industry's best-known celebrity photographers. **Page 11**

FLUID DESIGNS

Undergraduate Alexandra LaLonde's research helps improve microfluidic techniques

BY MICHELLE COMETA

It's uncommon for undergraduate students to be the first authors of a research paper accepted and published in a recognized, peer-reviewed journal. Alexandra LaLonde has had two—just this year. And the fourth-year biomedical engineering major co-authored two other articles since she started working in professor Blanca Lapizco-Encinas' Microscale Bio-Separations Laboratory in 2013.

LaLonde is part of a team developing techniques in microfluidics to separate live cells from dead cells so that scientists and clinicians can better analyze diseases. And once analyzed, intervention and cures are not too far behind.

This is what a student-centered research university looks like under RIT's new Strategic Plan as more undergraduates, like LaLonde, are immersed in lab experiences, collaborating with graduate students and post-doctoral scientists, and being mentored by faculty like Lapizco-Encinas. They are also contributing toward solving real-world problems as compelling as improving the future of health care.

Today, work in the Bio-Separations Lab is about developing techniques to build lab-on-a-chip devices, highly sophisticated laboratories on microchips. These miniaturized devices have multiple channels where fluid samples containing mixtures with *E.coli* (bacterium) or *S.cerevisiae* (yeast), for example, are assessed. Once exposed to electrical currents, the bio-particles separate, making them easier to analyze. Challenges, however, are in the system design even as microfluidic technologies and miniaturizing complex lab functions continue to mature. Researchers are also trying to determine the threshold of electrical fields applied to adequately manipulate the fluids but also ensuring that live cells are not damaged.

"These systems are very sophisticated and require a lot of integration, but it is not magic, it is doable," said Lapizco-Encinas, associate professor of biomedical engineering in RIT's Kate Gleason College of Engineering and recipient of a National Science Foundation grant for "Rapid and Dynamic Cell Assessments in Dielectrophoresis-based Microfluidic Devices."

"For lab-on-a-chip devices to work, a separation technique of a physical or chemical nature has to occur, and that is where we come into play. We are developing the techniques that can make those devices possible."

Some of those techniques were developed and tested by LaLonde, who was able to determine significant levels where the cells remain viable despite manipulation with high electric potentials.

"Once you apply the electrical voltage to the device with your sample containing cells in it, you can physically see how the cells get concentrated due to the electrical forces, depending on the size of the cells. It's instantaneous. To achieve similar results with traditional cell culture techniques, you have to put your sample in a medium and wait for it to grow in an incubator. That can take more than a day and then you have to analyze it yourself under a microscope. What if you can't wait a day for results?"

Imagine lab-on-a-chip capabilities at military installations to support injured combat troops, or to help rescue teams in natural disasters, or even in the case of the recent Ebola outbreak, to better support caregivers, she explained.

"It's basically taking a lab where you need it."

An additional plus was working with third-year biomedical engineering student Maria Romero-Creel as a research partner, and following in Lapizco-Encinas footsteps as a mentor herself.

"This was a unique experience because I was able to see someone else as enthusiastic about this as I was," LaLonde said.

"When she started working in my lab more than a year ago, Alexandra was interested in doing research," said Lapizco-Encinas. "She has grown so much since then, in her confidence and her skills. When she has to present her results in front of people, you have to see her…it's amazing to see such a brilliant young scientist."

With just one more year at RIT, LaLonde, a Syracuse, N.Y., native, intends to go into law after graduation and believes her experiences have given her an edge and a career focus.

"I am interested in patent law or malpractice suits, things like that, and I want to explore these fields," LaLonde said. "It's having the things that our program offers you, the materials, the experiences, the technical writing involved in this type of work, that is definitely going to help me in the future."

Lapizco-Encinas agreed. "Students have all these wonderful skills and capabilities, but they need to have the right environment to be successful. Our undergraduates have what they need to shine. I treat them like I treat any graduate or doctoral student because they are working to that level. They are all colleagues, with the same level of responsibility. I have had very rewarding experiences working and publishing several journal articles with undergraduate students as first authors.

"In some places, undergraduate researchers work in the laboratories mainly doing lesser type of activities—calibrate the equipment or prepare buffer solutions, and all those test tubes? Go and wash them. My undergrads are respected and treated as young scientists; they don't do anybody else's dishes." ■

Photo by A. Sue Weisler

Biomedical engineering student Alexandra LaLonde introduces fluid and electrical impulses onto a micro-device situated on a portable microscope. Under the guidance of professor Blanca Lapizco-Encinas, who finds great value in incorporating undergraduate students in research, the two are working together to develop microfluidic systems and techniques to separate, screen and analyze biological cells, as seen in the computer image.

Editor's note

This story is the first in a continuing series that demonstrates RIT's commitment to the new Strategic Plan. Look for this logo in future issues of *Athenaeum* to identify stories that highlight the plan's dimensions.

GREATNESS THROUGH DIFFERENCE
RIT'S 2015-2025 STRATEGIC PLAN

Web extra

■ To read RIT's Strategic Plan, "Greatness Through Difference," go to www.rit.edu/president/plan2025.