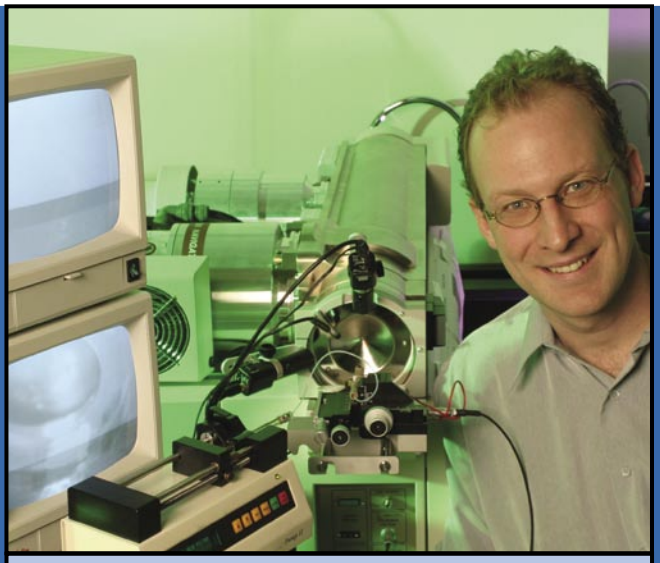
CMC MICROSYSTEMS IMPACT

Building Better Medical Tools

Replacing glass with plastic in microchips is boosting Canada to the forefront of genomics and proteomics

"Using glass, we may be able to reduce the price from about $250 to between $20 and $50 per chip. By using polymers or plastics, I'm betting we can make them for a couple of dollars a chip. You can expect them to be available in the market within the next couple of years."

Dr. Richard Oleschuk
Assistant Professor
Department of Chemistry
Queen's University



Dr. Oleschuk and his research team at Queen's University have installed polymeric microfluidic chips into a mass spectrometer in their lab. MDS Sciex hopes to use the chips in its high-end mass spectrometers within three years.

MDS Sciex is captivated by this innovative technology. The biomedical company based in Concord, Ontario is one of the world's leading manufacturers of mass spectrometers and is spearheading a new three-year project to develop better tools for scientists working in genomics and proteomics.

One of these new and improved tools is being developed by Dr. Richard Oleschuk, an assistant professor of Chemistry at Queen's University—one of five Canadian universities participating in the genomics project. Dr. Jed Harrison, a MEMS researcher who founded the University of Alberta spin-off, Advanced Integrated Microsystems, is also on the team.

Both Dr. Harrison and Dr. Oleschuk are experts in microfluidics, an emerging field that overcomes the current bottleneck in laboratory analyses. By using a microchip as a miniature lab, minute amounts of blood or other compounds can be screened at record speeds, leading to new drug discoveries and faster diagnoses.

But achieving this goal depends on researchers having access to the best tools and technologies available today. "Microfluidic devices tend to be constructed within glass, which is inherently expensive because of the photolithographic process," explains Dr. Oleschuk. "By using polymers or plastics, which only use photolithography for the first step, I'm betting that we can make them for a couple of dollars a chip."

At that price point, he says the chips also become disposable, which eliminates the risk of re-used chips contaminating a sample. Dr. Oleschuk's background is chemistry, not microelectronics. Yet he is one of the first researchers in Canada to take advantage of a new service offerd by CMC, that links university researchers who require customized microfluidics chips to Edmonton-based Micralyne Inc., a rising star in microfluidics fabrication.

"I use chips manufactured through CMC as the benchmark when testing our plastic ones," says Dr. Oleschuk. "Many more chemists are working with CMC these days because microsystems have potential far beyond electronics—there are limitless opportunities for advances in biomedical applications. We are bringing together microsystems with biomedical agents and complex chemical interactions. This requires the right partners, with the right expertise. CMC provides this microsystems expertise, and ultimately, helps this innovative research get to market faster." *cmc*