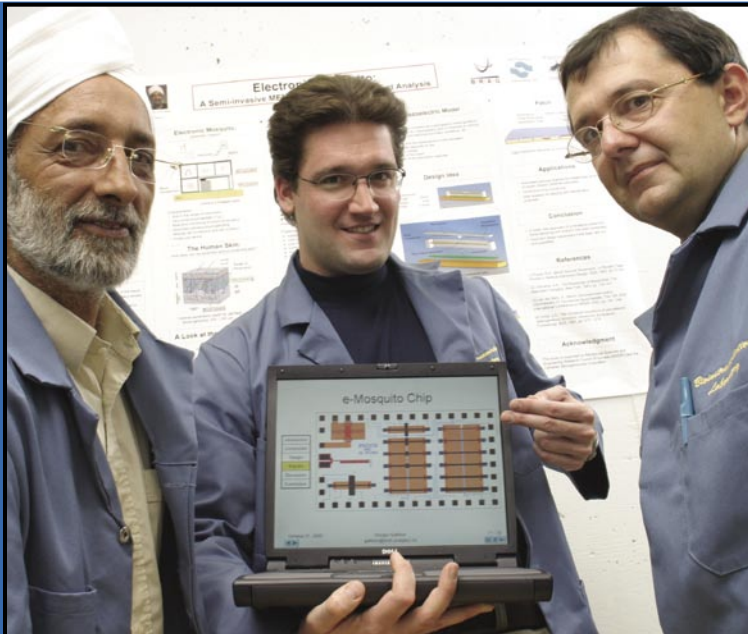


## Taking Control of Diabetes

**‘Electronic Mosquito™’ gives flight to an innovative way to measure glucose levels and deliver insulin**

*“The benefit of the e-Mosquito™ is that it provides an instant reading of glucose levels, which triggers an immediate and customized insulin injection. More importantly, it can be administered by the average person, without the support of health care providers or hospital staff. It improves the quality of life for the diabetes patient, and opens up opportunities for many other diagnostic tests.”*

**Dr. Karan Kaler**  
Professor  
Computer and Electrical Engineering  
University of Calgary



Professors Kaler (left), Mintchev (right), and graduate student Giorgio Gattiker (centre), present their first prototype of the e-Mosquito™ submitted for fabrication through CMC.

**C**MC is helping researchers at the University of Calgary build a MEMS (microelectromechanical system)-based mosquito that will help regulate insulin levels for people with diabetes. The electronic, or e-Mosquito™, system uses an array of micro-needles embedded in a disposable adhesive patch. When attached to the body, the e-Mosquito™ can penetrate the skin to draw minute blood samples to measure glucose levels.

“Think of it as an artificial pancreas,” explains Dr. Martin Mintchev, an electrical engineer at the University of Calgary who studied surgery as a post-doctoral fellow. “The device would extract blood as a mosquito would, electronically analyze the sample, and then transmit it to a wireless device that controls an insulin infusion pump so that the glucose balance in the body is maintained throughout the day.”

The idea for the e-Mosquito™ was sparked during a conversation between Dr. Mintchev and Dr. Karan Kaler, whose specialty is developing biomedical tools for studying living cells. The team has already developed a working prototype of the MEMS-based system, parts of which are being fabricated through CMC. A complete prototype will follow within six months to a year.

“CMC allows researchers to push the envelope and venture into new areas they might otherwise not be able to explore.” says Dr. Kaler. “Without CMC, researchers may be reluctant to pursue some truly novel ideas because there would be so many technical and financial hurdles to overcome in manufacturing a working prototype.”

The team is currently pursuing a patent for the technology and anticipates strengthening its industrial ties with companies like Micralyne Inc. of Edmonton, Alberta and DALSA Semiconductor of Bromont, Québec to move the market. It could be licensed to diagnostic companies within the next five years—helping diabetic patients to lead healthier lives. [cmc](#)