CMC MICROSYSTEMS IMPACT

Manipulating Cells—Improving the Detection of Cancer and Other Diseases

Jeffrey Keilman, a former graduate student at the University of Calgary, won the 2004 Micralyne Microsystems Design Award for MEMS and microfluidics for research that could make it easier to detect cancer and other diseases

"CMC Microsystems was invaluable in helping me to design this bio-analysis platform and verify that it works. It has also given me an opportunity to collaborate with my colleagues in biological sciences. It has certainly raised my awareness of how microelectronics and microfluidics can be used to improve our health care system in the future."

Jeffrey Keilman
Student
Faculty of Medicine
McGill University

Jeffrey Keilman, a former graduate student at the University of Calgary, won the Micralyne Microsystems Design Award at the TEXPO Research Competition, during CMC's 2004 Annual Symposium in Ottawa. His award-winning presentation was entitled: 'A Dielectrophoretic Bio-Analysis Platform Using Lexel Arrays'.

The manipulation of biological particles is essential to our ability to understand cells and develop future treatments for common diseases. Jeffrey Keilman collaborated with the Bio-research Group at the University of Calgary to develop a standardized hardware platform that, with a simple software change, can create varying electric fields to perform specific types of cell manipulation. This includes isolating and trapping bio-particles for indepth analysis.

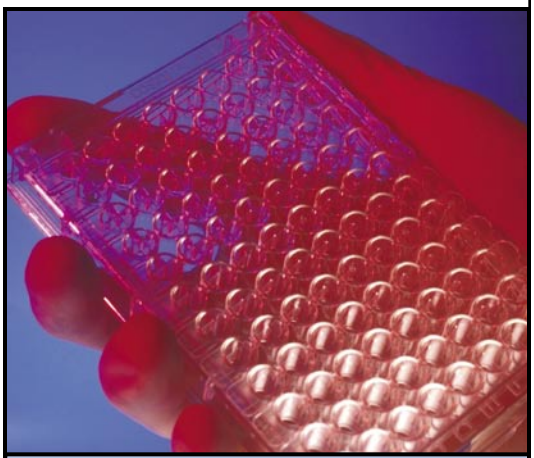
"The idea is to program multiple fields to perform multiple types of manipulation," explains Mr. Keilman, a former Master's student whose research was supervised by Dr. Karan Kaler and Dr. Graham Jullien, Professors at the University of Calgary. "The goal of my research was to create a more generalized electric structure, something that is automated and can be programmed and reconfigured for broad application."

Mr. Keilman, who is now studying medicine at McGill University, used design tools provided by CMC Microsystems to create these electric fields. The software control was implemented using FPGA (field-programmable gate array) technology, also provided by CMC.

The team aims to create a bio-analysis platform that rapidly and easily identifies, characterizes and manipulates biological particles. The process relies on a technique called dielectrophoresis, which uses the force from specific electric fields to levitate, separate and move particles. There are many potential applications for this technology.

For example, Dr. Karan Kaler, electrical engineer at the University of Calgary and Dr. Linda Pilarski, a biomedical researcher at the University of Alberta, are using dielectrophoretic techniques to develop better diagnostic tools for the detection of leukemia cells.

Mr. Keilman's research could contribute to the future development of a portable bio-analysis device that would help researchers and physicians quickly identify cells or bio-particles in the human body or the environment. *cmc*



Jeffrey Keilman relied on tools and technologies provided by CMC Microsystems to create a bio-analysis platform that rapidly identifies, characterizes and manipulates biological particles. He is now studying medicine at McGill University.