CMC Microsystems **Annual Report 2007**

Putting microsystems to work

Success Stories

NEW INFRARED LASER CHIPS COULD IMPROVE MONITORING OF GREENHOUSE GAS EMISSIONS AND MINIATURIZE NON-INVASIVE TESTING FOR DIABETES

Dr. Amr Helmy, Professor of Electrical and Computer Engineering at the University of Toronto, is developing new optoelectronic chips that could enable the design of more mobile and cost-effective lasers for a wide range of applications in life sciences, information and communications technologies (ICT) and the environment.

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"Our team is enhancing the efficiency, robustness and coverage of semi-conductor laser chips. This could enable new applications such as mobile environmental sensing for monitoring greenhouse gas emissions or non-invasive testing for diabetes. Access to industry-grade optoelectronics design tools and fabrication through CMC allowed us to turn theoretical concepts into working prototypes."

Dr. Amr Helmy
Professor, Electrical and Computer Engineering
University of Toronto

Dr. Amr Helmy, Professor of Electrical and Computer Engineering at the University of Toronto, is developing a new class of integrated optoelectronic chips that are more mobile, rugged and compact than those used by semiconductor companies today. They are well suited for widespread application in many industrial sectors—from life sciences to ICT and the environment.

These optoelectronic chips could enable a new generation of lasers that operate in the infrared region of the light spectrum. For scientists, lasers that are efficient, compact and cover a majority of the infrared spectrum offer a versatile tool to probe, manipulate and potentially generate new states of matter. This innovation also represents a significant breakthrough for industry. It could enable the design of more mobile and cost-effective lasers for a wide range of applications from medical diagnostic devices to environmental sensing systems, communications equipment, consumer electronic products and forensic testing and analysis devices.

Dr. Helmy benefits from optoelectronics products and services offered by CMC Microsystems in his research. A partnership between CMC and the Canadian Photonics Fabrication Centre (CPFC) of the National Research Council Canada enables university researchers to access the industry-caliber photonics fabrication processes offered by this facility. By working with CMC, Dr. Helmy manufactured and tested sophisticated photonic components that exploit light or photon dynamics.

"CMC makes it possible for university researchers in Canada to access highly specialized, industry-grade fabrication processes offered by CPFC. We could not have developed our first prototype without access to this service. Going forward, we will rely on CMC to help us fabricate and characterize the next-generation device," says Dr. Helmy, a pioneer in the area of photonic integration of nonlinear devices who has worked in both academia and industry.

Dr. Helmy currently holds one U.S. patent on this technology. He anticipates that these new laser chips will hit the consumer, industrial and medical markets in the next five-to-seven years.

CMC MICROSYSTEMS IMPACT

New Infrared Laser Chips Could Improve Monitoring of Greenhouse Gas Emissions and Miniaturize Non-Invasive Testing for Diabetes

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