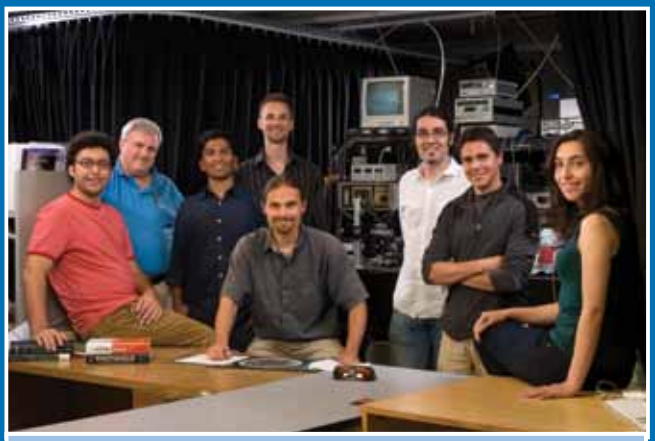
CMC MICROSYSTEMS IMPACT

Nanophotonics Course Provides Education and Saves Valuable Time in Chip Fabrication

CMC is underwriting many of the costs for individuals from various universities to attend a course in nanophotonics that offers an invaluable education for students and researchers in a range of fields, while providing the opportunity to save important research time through a partnership to fabricate chips at a European foundry. The course, held at the University of British Columbia (UBC), with software provided by Lumerical Solutions Inc., Design Workshop Technologies and RSoft Design Group, enables students to design, have fabricated, and test nanophotonic devices, either integrated with existing research or as a standalone learning opportunity.



Dr. Lukas Chrostowski (centre) works with this his research team at the Microsystems and Nanotechnology Group (MiNa) lab at the University of British Columbia.

Dr. Lukas Chrostowski, an Assistant Professor in the Department of Electrical and Computer Engineering at UBC and one of the course instructors, says that he and CMC colleagues noted a void in nanophotonics chip education, and worked to develop the course as a way to give students and researchers a greater understanding of the resources available to them.

"This technology makes it possible to fabricate photonic crystals, waveguides (photonic crystal or ridge), gratings for fiber coupling, multiplexers (diffraction or arrayed waveguide), ring resonators/filters and other components," he says. "Best of all, the course makes it possible to design, have fabricated and test a quality device within a year." Nanophotonic technology has historically been developed in-house, however students in the program can save valuable research time by having their designs fabricated through the foundry at IMEC, Europe's largest independent research centre in nanoelectronics and nanotechnology.

Once students have learned to use the design software tools in a classroom setting, they independently research a specific topic and design their device, laying out development mask details that CMC will verify against technology constraints before transferring the details to IMEC for device fabrication. Design and modeling are done with the student's own computer, with access to software tools provided through CMC. UBC's full graduate course takes place over two semesters and is worth four credits. In the fall of 2009, however, the instruction is also being offered to students across Canada in a compressed and more intense version involving a week-long training session at UBC followed by three months of support through the design and layout stages, with testing taking place in March and April after CMC returns fabricated devices from IMEC.

Nanophotonics can offer real benefits to a number of disciplines, particularly in the semiconductor industry, which is struggling with memory and speed quality due to demands on the technology. Optical communication integrated with electronics can allow for a dramatic and necessary increase in speed and efficiency between CPU cores. The course has also been used to develop technologies for many other research fields, including carbon nanotubes for electron emissions tests, gyroscope development, environmental sensors, and biomedical applications to make implants more compatible to the human body.

Dr. Chrostowski notes that the course has been very successful, even more so now that CMC is providing subsidies for travel, allowing students from across Canada to attend the week-long intensive course at UBC. "We're thrilled to be able to make this important program accessible across Canada," he says, "and we're looking forward to supporting new levels of innovation using nanophotonics technology." *cmc*