



Communications  
Research Centre  
Canada

Centre de recherches  
sur les communications  
Canada

An Agency of  
Industry Canada

Un organisme  
d'Industrie Canada

Laboratory for Photonic Components and Systems Research

# PHOTONICS

# WHERE THE FUTURE BEGINS

Welcome to the Communications Research Centre Canada's (CRC) Laboratory for Photonic Components and Systems Research – where ideas for future-generation optical communications are born. Through a commitment to long-term research and development (R&D), we create novel concepts and technologies that optical communication companies will need for their next-generation products.

Photonics is poised to become the No. 1 enabling technology for broadband communications, as companies around the world race to implement new breakthroughs.

A major industrial niche for Canada, close to 500 Canadian-based companies – from multi-national giants to small start-ups – now produce all kinds of photonics-related products for the world market.

The demand for new ideas is high. At CRC, we are helping Canada build solid foundations for future innovative products.

## OUR MISSION

Our Laboratory's R&D focus is on photonic component technologies that "add value" or enhance the performance of broadband network systems and applications.

As part of CRC – the federal government's Centre of Excellence for communications R&D – our mission is to meet key technical challenges of the 21st century for the knowledge-based economy.

## WE DO THIS BY:

- Conducting R&D on next-generation optical components and systems for the telecommunications sector
- Carrying out this R&D together with national and international academic and research organizations
- Transferring technology to industry for commercialization

## BUILDING FOR THE FUTURE

Our Laboratory will soon include a 40,000-square-foot expanded facility, with new state-of-the-art laboratories and equipment, and offices for new staff and guest workers. The total value: \$30 million.

## LEADING-EDGE RESEARCH

Our Laboratory is an integrated series of facilities designed to conduct research projects on a wide variety of topics, ranging from basic device structures to optical networking technologies and applications. Currently, the research program has three main areas of focus:

### Photonic components for broadband communications networks

This activity involves the design, characterization and testing of high-speed optoelectronic circuits (OEICs), planar lightwave circuits (PLCs), and fibre-based optical devices. Topics of study within these areas include: ternary and quaternary semiconductor structures; novel polymer materials; exploitation of photosensitivity in optical fibre, polymer and doped dielectric films; photodetectors, optical waveguides and switching arrays; nonlinear optical effects in organic and inorganic materials; optical device and component design, processing, integration and packaging techniques.



## A PAST TO "BRAGG" ABOUT

CRC is recognized as a Canadian pioneer in optical communications, having been involved in photonics R&D for more than 30 years.

CRC can boast of many technological breakthroughs in the field, such as the invention of several types of fibre Bragg grating components, and the licensing of patents and know-how to more than 35 national and international companies, including several successful spin-offs.

## WORLD-CLASS FACILITIES

Our Laboratory has a full complement of state-of-the-art facilities and equipment to support its research program, including:

- A microelectronics fabrication and assembly facility with over 4,000 square feet of clean room laboratories
- An MOCVD system for the growth of GaInAs, AlInAs and GaInAsN semiconductor layers for long-wavelength optoelectronics
- PECVD doped-dielectric deposition and etching systems
- Laser-assisted device and component fabrication equipment
- Materials preparation and diagnostic equipment
- Optical component measurement systems and testbeds
- Network systems and applications laboratories with access to local, national and international optical research networks

Our Laboratory also has ready access to complementary facilities and researchers throughout CRC conducting R&D in areas such as wireless, multimedia and satellite systems.



### Optical Networking and Testbeds

This activity involves the development, testing and validation of advanced protocols, and routing and switching techniques for optical networks based on novel optical devices and components. Testbeds, including an inter-city dark fibre network, are used to carry out the following topics of study: management of optical networks; inter- and intra-domain routing in optical networks; protected paths in a meshed DWDM network; fibre-to-the-home network access and interface issues; dynamic provisioning of lightpaths over a DWDM infrastructure.



## WORKING TOGETHER MAKES US STRONGER

CRC is a member of the following Canadian organizations involved in photonics and optical networking:

- Canadian Institute for Photonics Innovations
- Canadian Photonics Consortium
- CANARIE Inc.
- Communications and Information Technology Ontario
- National Capital Institute of Telecommunications
- Ottawa Photonics Cluster
- Ottawa Photonics Research Alliance

## CONTACT

For more information, or to find out how you can work with us, please visit [www.crc.ca](http://www.crc.ca) or contact:

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### Networked Multimedia and Applications

This activity is intended to demonstrate applications that require large amounts of managed bandwidth and a high quality of service. Topics of study include: collaborative multimedia learning environments; immersive virtual environments; high-quality conferencing environments; Virtual Private Networks (VPNs) for implementing security and service levels over a public network infrastructure; and streaming technology to deliver high quality video-on-demand over Internet Protocol.