## Photonic integration: beyond telecom and datacom

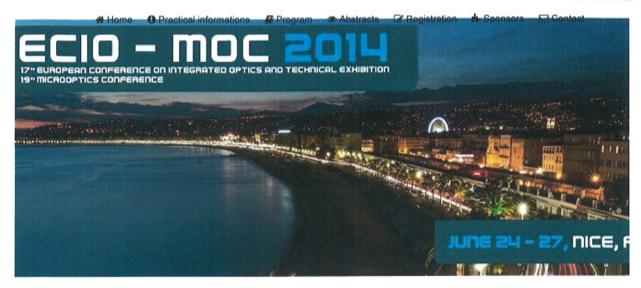
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**Abstract:** In this paper we elaborate on the use of silicon photonic integrated circuits for sensing applications. We will discuss disposable bio-sensing chips, chips for biomedical applications such as optical coherence tomography and laser doppler vibrometry as well as integrated spectroscopic sensors based on Raman spectroscopy and vibrational spectroscopy.

Silicon photonics has emerged as a prominent platform for the realization of high data-rate transceivers for use in optical interconnect and telecommunication applications. Silicon photonics leverages the existing technologies in advanced CMOS fabs, which has resulted in a very fast progress in this field as well as the development of an industrial supply chain. The available high refractive index contrast also allows for unprecedented miniaturization. The market potential for silicon photonics is however much broader than datacom and telecom, and there are especially opportunities in the area of lab-on-a-chip. In this paper we will elaborate on the development of a disposable biosensor platform for the detection of biomolecules, a technology that starts to become commercially available. Current research efforts focus on the realization of spectroscopic sensor systems, both in the near-infrared (Raman spectroscopy using SiN waveguide technology) and the mid-infrared (vibrational spectroscopy using Si/Ge technology), in order to enhance the selectivity of currently available sensors. Also in the biomedical field silicon photonic integrated circuits for e.g. optical coherence tomography and laser doppler vibrometry are of interest.





# Program

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### **Topics**

- · Photonic ICs: design, fabrication, hybrid or monolithic approach
- · Passive devices: Fibers, Waveguides, Multi/Demultiplexers, Add-drop multiplexers, Branching and mixing components, Filters, Microlenses, Diffractive optical elements, Isolators, Polarizers, etc.
- · Dynamic and Functional Devices: MEMS, Switches, Modulators, Tunable devices, Deflectors, Optical buffers, etc
- · Nonlinear devices: wavelength converters, frequency mixers, signal regenerators,
- · Active devices: Lasers, LEDs, VCSELs, Array lasers, Amplifiers, Detectors,
- · Polymer photonics including OLEDs
- · Silicon photonics
- · Nanophotonics, photonic crystal materials and devices, metamaterials
- · Plasmonic waveguides and devices
- · Membrane photonics and optomechanical devices
- · Materials and fabrication technologies for guided waves devices and quantum optical or opto-electronic structures
- Modelling, theory and simulation of active and passive guided wave devices and quantum optical or opto-electronic structures
- · Characterization and testing of guided waves devices and circuits,
- · Packaging and Hybrid integration: flip-chip and bonding techniques, novel pigtailing and packaging technologies, micro- optic benches
- · Application: telecom and datacom, quantum communication, biophotonics, instrumentation and sensors, micro- wave applications, data storage, lighting and displays
- · Production technologies, foundry concepts and industrial exploitation

### Register for the event

**☑** REGISTRATION

Book your Hotel!

#### **MIMPORTANT DATES**

April 2014

Opening registration

April 25, 2014

Abstract notification (sent by email to First Authors)

May 15, 2014

Earlybird online registration

June 10, 2014

Online registration deadline

June 23 - 24, 2014

LFIB 2014

June 24 - 27, 2014

ECIO MOC 2014

June 27 - 28, 2014

**OWTNM 2014** 

## Plenary Talks (confirmed)

Kenichi Iga ,Tokyo Institute of Technology, Japan

Thomas L. Koch, University of Arizona, USA

Advances in integrated optics technologies,

Gunther Roelkens, Ghent University, Belgium

Photonic integration: beyond telecom and datacom,

Phillip Russell, Max Planck Institute for the Science of Light, Erlangen, Germany Control of Light-Matter Interactions in Microstructured Glass Fibres

Sébastien Tanzilli, University Nice Sophia Antipolis, France Quantum Integrated Optics,

Laurent Vivien, Université Paris-Sud, France Silicon and Germanium optoelectronic devices

#### Tutorials (confirmed)

Hirochika Nakajima, Waseda University, Japan 40 years anniversary of Ti:LiNbO3 and beyond"

Alejandro Ortega-Moñux, University of Malaga, Spain
Design of integrated photonic devices for high-speed coherent receivers,

## Invited (confirmed)

T. Suhara, Osaka University, Japan

Grating coupler integrated semiconductor laser diode

R. Kou, Waseda University, Japan

Graphene integrated silicon photonics

T. Tenemura, Tokyo University, JAPAN

Polarization converter

K. Hamamoto, Kyushu University, JAPAN

Optical mode switch

I. Favero, MPQ Paris 7, France

On chip gallium arsenide optomechanical systems

A. Martin, GAP, Genève, Switzerland

Nonlinear interaction between two independent single photons

N. Hanazawa, NTT, JAPAN

LP21 mode device based on silica waveguide

K. Williams, TU Eindhoven Holland

Active optical switches

G. Bellanca, University Ferrara, Italy

Ultracompact photonic crystal integrated circuits:

Connecting tiny devices to achieve high-performances, modeling and experiences

T. Watanabe, Yokohama National University, Japan

Fan-in/Fan-out devices using laminated polymer waveguide for multi-core fibers.

M. Smit, TU Eindhoven, Holland

Foundry based approach for ImP based PIC development,

R. Ram, MIT, USA

CMOS Photonic Integrated Circuits and Systems

K. Suzuki, AIST, Japan

Si-wire based 8 × 8 strictly-non-blocking PILOSS switch

G. Mashanovich, University of Southampton, UK

Passive and active silicon photonic devices for the mid-IR

F. Sciarrino, Sapienza Università di Roma, Italy

Quantum simulation with integrated photonics.

S. Höfling, University St Andrews, UK

Integrated single photon circuits

J. Ctyroky, Institute of Photonics and Electronics, Czech Republic

Computational analysis of subwavelength waveguide structures