Driving and Control Techniques for Large Scale Programmable Photonics Circuits

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Abstract— Programmable silicon photonics is an emerging field that aims to add exibility to optical chips by allowing the functions performed by the device to be defined after its fabrication, via programming. As the functions performed by a programmable circuit emerges from the number of reconfigurable elements in the device, there is a need to integrate a larger number of tunable components in the circuit, which results in challenges regarding driving and control. In this paper we present our techniques used to operate large scale silicon photonics circuits, with emphasis on programmable devices.

15:30 Tunable Nanoplasmonic Transducers: Functional Materials for Optical Biosensing
Invited
Adriano Colombelli (*Institute for Microelectronic and Microsystems*); *Daniela Lospinoso* (*Institute for Microelectronic and Microsystems*); *M. Cesaria* (*Institute for Microelectronic and Microsystems*); *A. Taurino* (*Institute for Microelectronic and Microsystems*); *Roberto Rella* (*Institute for Microelectronic and Microsystems*); *Maria Grazia Manera* (*Institute for Microelectronic and Microsystems*);

Session 4P9b
SC4: Reconfigurable and Programmable Photonic Integrated Circuits

Thursday PM, June 20, 2019

Room 4 - Mezzanine

Organized by Jian Wang

Chaired by Jian Wang

15:50 Silicon Optical Space and Mode Switches
Invited
Lin Yang (*Institute of Semiconductors, Chinese Academy of Sciences*); *Ting Zhou* (*Institute of Semiconductors, Chinese Academy of Sciences*); *Hao Jia* (*Institute of Semiconductors, Chinese Academy of Sciences*); *Lei Zhang* (*Institute of Semiconductors, Chinese Academy of Sciences*); *Xin Fu* (*Institute of Semiconductors, Chinese Academy of Sciences*);

16:10 Programmable Silicon Photonic Processor Based on a SCOW Resonant Structure
Invited
Liangjun Lu (*Shanghai Jiao Tong University*); *Lin Shen* (*Shanghai Jiao Tong University*); *Wei Gao* (*Shanghai Jiao Tong University*); *Linjie Zhou* (*Shanghai Jiao Tong University*); *Jianping Chen* (*Shanghai Jiao Tong University*);

16:30 **Coffee Break**

17:00 Silicon Mode- and Polarization-selective Switch
Invited
Yong Zhang (*Shanghai Jiao Tong University*); *Yu He* (*Shanghai Jiao Tong University*); *Qingming Zhu* (*Shanghai Jiao Tong University*); *Ciyuan Qiu* (*Shanghai Jiao Tong University*); *Yikai Su* (*Shanghai Jiao Tong University*);

17:20 Towards Reconfigurable Multi-functional Photonic Integrated Signal Processor
Invited
Jian Wang (*Huazhong University of Science and Technology*);

17:40 SOI-based Photonic Integrated Circuits for Tunable OAM Generation
Invited
Muhammad N. Malik (*CNIT*); *Ning Zhang* (*University of Glasgow*); *Charles Caer* (*Université Paris-Sud 11*); *Mirco Scaffardi* (*CNIT*); *Veronica Toccafondo* (*CNIT*); *Charalambos Klitis* (*University of Glasgow*); *Jiangbo Zhu* (*University of Bristol*); *Xinlun Cai* (*Sun Yat-Sen University*); *Siyuan Yu* (*University of Bristol*); *Martin Lavery* (*University of Glasgow*); *Gianni Preve* (*CNIT*); *Marc Sorel* (*University of Glasgow*); *Bert Jan Offrein* (*IBM Research — Zurich*); *Antonella Bogoni* (*Scuola Superiore Sant'Anna*);

18:00 Processing of Optical Data Signals Using Integrated Devices
Invited
Michael Galili (*Technical University of Denmark*); *L. K. Oxenlowe* (*Technical University of Denmark*);

18:20 Driving and Control Techniques for Large Scale Programmable Photonics Circuits
Invited
Antonio Ribeiro (*Ghent University*); *Muhammad Umar Khan* (*Ghent University IMEC*); *L. Van Iseghem* (*Ghent University*); *M. Wang* (*Ghent University*); *S. Declercq* (*Ghent University*); *Wim Bogaerts* (*Ghent University-IMEC*);

18:40 Manipulating Optical Beams with a Programmable Silicon Photonic Mesh
Invited
Maziyar Milanizadeh (*Informazione e Bioingegneria — Politecnico di Milano*); *Piero Borga* (*Informazione e Bioingegneria — Politecnico di Milano*); *David A. B. Miller* (*Stanford University*); *Andrea Melloni* (*Politecnico di Milano*); *Francesco Morichetti* (*Informazione e Bioingegneria — Politecnico di Milano*);

Session 4P10a
SC3: Glass Photonics: Novel Systems and Ongoing Applications 2

Thursday PM, June 20, 2019

Room 12 - Mezzanine

Organized by Anna Lukowiak, Maurizio Ferrari

Chaired by Anna Lukowiak, Maurizio Ferrari

14:30 Luminescent Hafnia Nanoparticles by Non-aqueous Sol-gel: Toward Particle-based Optical Materials
Invited
Alessandro Lauria (*Swiss Federal Institute of Technology (ETH-Zurich)*);