

Title: Integration of MEMS for Scalable Programmable Photonic Circuits

Abstract: Our recent advances in wafer-scale integration of Micro-Electro-Mechanical Systems in Silicon Photonics have shown high performance tuneable couplers, filters, switches, and phase shifters that provide an advanced technology basis for emerging applications requiring very large-scale photonic integration such as programmable photonics.

Speaker and Authors:

Niels Quack¹, Alain Yuji Takabayashi², Hamed Sattari², Pierre Edinger³, Gaehun Jo³, Kristinn B. Gylfason³, Frank Niklaus³, Umar Khan⁴, Peter Verheyen⁵, Arun Kumar Mallik⁶, Jun Su Lee⁶, Moises Jezzini⁶, Padraic Morrissey⁶, Cleitus Antony⁶, Peter O'Brien⁶, Wim Bogaerts⁴

¹ *The University of Sydney, School of Aerospace, Mechanical and Mechatronic Engineering
2006 NSW, Australia*

² *École Polytechnique Fédérale de Lausanne (EPFL),
1015 Lausanne, Switzerland*

³ *Division of Micro and Nanosystems, KTH Royal Institute of Technology,
114 28 Stockholm, Sweden*

⁴ *Ghent University - IMEC, Photonics Research Group, Department of Information
Technology, Technologiepark-Zwijnaarde 126, 9052 Gent, Belgium*

⁵ *imec vzw. 3DSIP Department, Si Photonics Group, Kapeldreef 75,
3001 Leuven, Belgium*

⁶ *Tyndall National Institute, Lee Maltings Complex Dyke Parade,
T12 R5CP Cork, Ireland*



About the Speaker: Niels Quack is Associate Professor for Micro- and Nanosystems in the School of Aerospace, Mechanical and Mechatronic Engineering at the University of Sydney, Australia. He received the M.Sc. degree from Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland, in 2005, and the Dr.Sc. degree from Eidgenössische Technische Hochschule Zürich (ETH), Switzerland, in 2010. From 2011 to 2015, he was Postdoctoral Researcher and Visiting Scholar with the Integrated Photonics Laboratory, Berkeley Sensor and Actuator Center, University of California, Berkeley, CA, USA. From 2014 to 2015, he was Senior MEMS Engineer with Sercalo Microtechnology, Neuchâtel, Switzerland. From 2015 to 2021, he was Swiss National Science Foundation funded Assistant Professor with Ecole Polytechnique Fédérale de Lausanne (EPFL), Switzerland. He has authored and co-authored more than 100 papers in leading technical journals and conferences. His research interests focus on micro- and nanosystems engineering, with an emphasis on exploring micro- and nanofabrication techniques, materials, and integration of mechanics and photonics at the micro- and nanoscale. These novel advanced micro- and nanosystems find applications in fiber-optical communication systems, imaging, quantum sensing, computing and information processing, sensors and space communications. He is Steering Committee Member of the IEEE International Conference on Optical MEMS and Nanophotonics (OMN) and served as General Chair of the IEEE OMN 2018 and the Latsis Symposium 2019 on Diamond Photonics. He has served as Chairing Committee Member for the flagship conferences in the field, including ECOC, CLEO, SPIE OPTO, Transducers or MNE. He is associate editor of the IEEE Journal of Microelectromechanical Systems (JMEMS) and of the SPIE Journal of Optical Microsystems (JOM). He is a Senior Member of IEEE, Member of Optica (formerly OSA) and of SPIE.