Ph.D Giovanni Gilardi

Present Address
De Lismortel, 300
5612AK Eindhoven – NL
Mobile: +31 628957418

Permanent address
Via IV Novembre, 51
00010 Monteflavio (Rome) -IT
Mobile : +39 3402675320

Italian Nationality
Born on March 06th 1982 in Tivoli, Italy
e-mail: gilardihouse@libero.it
web : www.giovannigilardi.com

CURRENT POSITION

Post-Doctoral researcher – Technical University of Eindhoven (TUE) ***Jan 2012 – Present***

Design, fabrication and characterization of low-cost, small-footprint, high-performance Indium Phosphide – based transceivers

EDUCATION

Ph.D Electronic engineering – University of Rome "Sapienza" ***Nov 2008 – Nov 2011***

Field of study: Photonics, Optoelectronics, Integrated optics

Doctorate thesis title: Lightwave circuits based on organic materials for optical signal filtering and switching in WDM communication systems and sensing (Best PhD thesis award)

Visiting Ph.D scientist – Technical University of Denmark (DTU) ***Jan 2011 – Jun 2011***

Field of study: Plasmonics

Activity description: Design and fabrication of optofluidic sensors based on surface plasmon resonances

Scholarship – National council for research (CNR-IMM Rome) ***Jan 2008 – Oct 2008***

Field of study: Liquid crystals, Electro-optical devices, Microsphere resonators

Activity description: Design and fabrication of electro-optical devices based on microsphere resonators

Master in electronic engineering – University of Rome "Sapienza" ***Dec 2007***

Field of study: Optoelectronic, Photonics, Analogue and digital electronic circuits, Radiofrequency circuits

TECHNICAL AND SCENTIFIC EXPERTISE

I have a strong background in integrated optics, both as a generalist, spanning the whole chain of optical chip design, fabrication and characterization, and as a specialist, with main expertise in high bandwidth transceivers based on Indium Phosphide. Over the last eight years I have worked with all the major photonic integration platforms.

- Photonic integrated circuits: design, fabrication and testing. Expertise in measurement in free space, fiber, RF characterization of photonic circuits, i.e. measurements with network Analyzer, eye-diagrams and BER test.
- Design, fabrication and characterization of integrated optical devices integrating liquid crystals and azo-compounds as electro-optical and all-optical tuning medium
- Plasmonic devices fabrication and characterization
- I have developed more than eight years of experience in clean room fabrication, working with indium phosphide, silicon and glass, and with the most common polymers

Skills / Key words: Design, simulation and fabrication of integrated optical devices, Indium Phosphide based devices, Silicon based devices, Liquid crystals, Optofluidic, Plasmonics, WGM resonators, Optical characterization, Radiofrequency measurement, clean room fabrication, Comsol, CST, ADS, Rsoft, Phoenix software.

PROFESSIONAL EXPERIENCES

I joined the *"Institute for Microelectronics and Microsystems"* of the Italian national research council (CNR - IMM) in Rome, from January to October 2008. My activity, supervised by Dr. Romeo Beccherelli, was related to develop tunable resonators based on microspheres and liquid crystals and optofluidic sensors based on ring resonator and microspheres.

From Januray 2011 to June 2011 I was visiting scientist at the Department of Photonics Engineering Structured Electromagnetic Materials of DTU, *"Technical University of Denmark"*, with supervisor Prof. Niels Asger Mortensen. During this period my scientific subject was focused on fluid tuning of plasmonic nanostructures.

On January 2012 I was enrolled as post-doctoral researcher at the Electrical Engineering Department – Photonic Integration Group of TU/e *"Technical University of Eindhoven"*, with supervisors Prof. Meint Smit and Prof. Mike Wale. My study investigates the fundamentals limits in miniaturization and performance of photonic integrated circuits due to crosstalk phenomenon (i.e. thermal, radiofrequency and optical crosstalk). The core of my activity deals with the design, fabrication and characterization of low-cost, small-footprint, high-performance InP-based transceivers

AWARDS

Best PhD thesis award for "Application of liquid crystals for optical signal filtering and switching in WDM communication systems" from the Italian Liquid Crystal Society for the years 2012 and 2013 (1000 Eur).

PARTICIPATION IN RESEARCH PROJECTS

GTIP - STW perspectief programme 12 ***Jan 2012 – Jan 2016***

ELPHI: Exploring the limits of photonic integration

Technical University of Eindhoven (TUE), Photonic Integration group

Paradigm Project ***Sep 2013 – Sep 2014***

7th Framework Program of the EC

Technical University of Eindhoven (TUE), Photonic Integration group

Danish Ministry of Science, Technology and Innovation ***Jan 2011 – Jun 2011***

Catalysis for Sustainable Energy initiative Center

Technical University Denmark (DTU)

Bilateral European project Italy – Turkey ***Jan 2008 – Nov 2011***

Microphotonic resonators on silicon for optical communications and sensing

CNR – IMM Rome (National Council for Research – Institute for Microelectronics and Microsystems)

TEACHING EXPERIENCE

- Co-supervisor of five master/diploma students and three PhD students
- Three years of supervisions in undergrad lab courses
- Supervision of student seminars and coaching for presentations
- Three years of participation in exam grading

REFEREE AVAILABLE TO CONTACT

Professor **Meint Smit**, Technical University of Eindhoven (TUe) – Photonic Integration Group
e-mail: M.k.smit@tue.nl Phone: +31 40 247 5058

Professor **Mike Wale**, Oclaro Ltd Technology
e-mail: Mike.Wale@oclaro.com Phone: +44 (0) 1327 356560

Professor **Niels Asger Mortensen**, Technical University of Denmark (DTU)
e-mail: namo@fotonik.dtu.dk Phone: +45 4525 6622

Professor **Antonio d'Alessandro**, University of Rome "Sapienza"
e-mail: dalessandro@die.uniroma1.it Phone: +39 06 44585459

REFERRED INTERNATIONAL JOURNAL PUBLICATIONS

[J22] **G. Gilardi**, W. Yao, M. Smit and M. Wale*, "Thermal crosstalk in InP-based WDM transceivers: effects and on-chip technological solutions,"* Submitted Photonics Research (May 2015).

[J21] Z. Cao, X. Zhao, N. Tessema, Q. Wang, W. Yao, **G. Gilardi**, X. Leijtens, H.P.A. van der Boom, E. Tangdiongga and A.M.J. Koonen, "*A mm-wave beam-steered radio-over-fiber system enabled by a remotely-tuned optical delay line*," Submitted Optics Letters (April 2015).

[J20] A. d'Alessandro, R. Asquini, **G. Gilardi** and Luca Martini, *"Polarization independent nematic liquid crystal waveguides for optofluidic applications,"* Submitted IEEE Photonic Technology Letters (Mar 2015).

[J19] **G. Gilardi**, W. Yao, M. Smit and M. J. Wale, *"Observation of dynamic ER and BER degradation due to thermal effects in InP-based integrated modulators,"* IEEE Journal of Lightwave Technology, Vol. 33, No. 11, pp. 2199-2205 (2015).

[J18] W. Yao, **G. Gilardi**, N. Calabretta, M. Smit and M. J. Wale, *"Experimental and numerical study of electrical crosstalk in photonic integrated circuits,"* IEEE Journal of Lightwave Technology, Vol. 33, No. 4, pp. 934 - 942 (2015).

[J17] **G. Gilardi**, W. Yao, M. Smit and M. J. Wale, *"Deep trenches for thermal crosstalk reduction in InP-based photonic integrated circuits,"* IEEE Journal of Lightwave Technology, Vol. 32, No. 24, pp. 4262-4268 (2014).

[J16] **G. Gilardi**, W. Yao, H. Rabbani Haghighi, M. Smit and M. J. Wale, "*Substrate thickness effects on thermal crosstalk in InP-based photonic integrated circuits*," IEEE Journal of Lightwave technology, Vol. 32, No. 17, pp. 3061-3066 (2014).

[J15] E. Bitincka, **G. Gilardi**, M. K. Smit, "*On-wafer optical loss measurements using ring resonators with integrated sources and detectors*," IEEE Photonics Journal, Vol. 6, No. 5, pp 1-12 (2014)

[J14] **G. Gilardi**, M. Smit, "Generic InP-based Integration Technology: Present and Prospects", PIER - Progress in Electromagnetics Research, Vol. 147, pp. 23-35 (2014).

[J13] M. Smit, ***G. Gilardi***, +50 authors, "*An introduction to InP-based generic integration*", Semiconductor Science and Technology, Vol. 29, 083001, pp. 1 – 41 (2014).

[J12] **G. Gilardi**, S. Xiao, R. Beccherelli, A. d'Alessandro and N. A. Mortensen, "*Plasmon resonance optical tuning based on photosensitive composite structures*", JOSA B, Vol. 31, No. 2, pp. 1-6 (2014).

[J11] **G. Gilardi** and R. Beccherelli, "*Integrated optics nano-opto-fluidic sensor based on whispering gallery modes for picoliter volume refractometry*", Journal of Physics D: Applied Physics, Vol. 46, No. 105104 (2013).

[J10] **G. Gilardi**, L. de Sio, R. Beccherelli, R. Asquini, A. d'Alessandro and C. Umeton, "All-optical and thermal tuning of a Bragg grating based on photosensitive composite structures containing liquid crystals", Molecular crystals and liquid crystals, Vol. 558, Issue 1, No. 64-71 (2012).

[J09] **G. Gilardi**, S. Xiao, R. Beccherelli, A. d'Alessandro and N. A. Mortensen, "*Periodically modulated tunable thin metal films*", Photonics and Nanostructures, Vol. 10, No. 1, pp. 177-182 (2012).

[J08] **G. Gilardi**, L. de Sio, R. Beccherelli, R. Asquini, A. d'Alessandro and C. Umeton, "*Observation of tunable optical filtering in photosensitive composite structures containing liquid crystals*", Optics Letters, Vol. 36, No. 24, pp. 4755-4757 (2011).

[J07] **G. Gilardi**, R. Asquini, A. d'Alessandro and G. Assanto, "*An electro-optically tunable Bragg reflector based on liquid crystals*", Molecular Crystals and Liquid Crystals, Vol. 549, No. 1, pp. 62-68 (2011).

[J06] **G. Gilardi**, A. d'Alessandro and G. Assanto, "*Integrated Bragg reflector in low index media: enabling strategies for wavelength tunability in electro-optic liquid crystal*", Optical engineering, Vol. 50, No. 7, pp. 071108 1-9 (2011).

[J05] A. d'Alessandro, R. Asquini, M. Trotta, **G. Gilardi**, R. Beccherelli and I.C. Khoo, "*All-optical intensity modulation of near infrared light in a liquid crystal channel waveguide*", Applied Physics Letters, Vol. 97, No. 9, pp. 093302 1-3 (2010).

[J04] **G. Gilardi**, R. Asquini, A. d'Alessandro and G. Assanto, "*A Widely tunable electro-optic distributed Bragg reflector in liquid crystal waveguide*", Optics Express, Vol. 18, Issue 11, pp. 11524-11529 (2010).

[J03] D. Donisi, B. Bellini, R. Beccherelli, R. Asquini, **G. Gilardi**, M. Trotta and A. d'Alessandro, "*A switchable liquid crystal optical channel waveguide on channel*", Journal of quantum electronics, Vol. 46, No. 15, pp. 762-768 (2010).

[J02] **G. Gilardi**, D. Donisi, A.Serpenguezel and R. Beccherelli, "Liquid crystal tunable filter based on microsphere resonators", Optics Letters, Vol. 34, No. 21, pp. 3253-3255 (2009).

[J01] R. Asquini, D. Donisi, M. Trotta, A. d'Alessandro, B. Bellini, **G. Gilardi** and R. Beccherelli "Realization of a liquid crystal electrically controlled optical waveguide on micromachined silicon", Molecular Crystals and Liquid Crystals, Vol. 500, No. 1, pp. 23-30 (2009).

CONFERENCE PROCEEDING PUBLICATIONS

[C24] G. Gilardi, W. Yao, M. Smit and M. Wale, "Dynamic extinction ratio and bit error rate degradation due to thermal crosstalk in InP integrated modulators," IPR 2015, 27 Jun - 1 Jul 2015, Boston, USA.

[C23] W. Yao, G. Gilardi, M. Smit and M. Wale, "Electrical crosstalk in integrated Mach-Zehnder modulators caused by a shared ground path," IPR 2015, 27 Jun - 1 Jul 2015, Boston, USA.

[C22] W. Yao, **G. Gilardi**, M. Smit and M. Wale, "*Simultaneous full C-band tuning of three integrated DS-DBR lasers in presence of strong thermal crosstalk," CLEO/Europe-EQEC 2015 21 - 25 Jun 2015, Munich, Germany.*

[C21] W. Yao, **G. Gilardi**, M. Smit and M. Wale, "*Design and simulation of a series push-pull Mach-Zehnder modulator in a generic photonic integration platform,"* 19th Annual Symposium of the IEEE Photonics Benelux Chapter, 3-4 Nov 2014, Enschede, The Netherlands.

[C20] R. Asquini, L. Martini, **G. Gilardi**, R. Beccherelli and A. d'Alessandro, *"Polarization independent optofluidic nematic liquid crystal channels"*, IPC 2014, 12-16 Oct, San Diego, USA.

[C19] **G. Gilardi**, W. Yao, M. Wale and M. Smit*, "On-Chip thermal crosstalk reduction in InP-based photonic integrated circuits,"* IPR 2014, 13-17 July, San Diego, USA.

[C18] W. Yao, **G. Gilardi**, M. Wale and M. Smit*, "Performance degradation of integrated modulator arrays due to electrical crosstalk,"* IPR 2014, 13-17 July, San Diego, USA.

[C17] ***INVITED*** **G. Gilardi***, "Lightwave circuits based on organic materials for optical signal filtering and switching in WDM communication systems*," 7th Italian-Japanese Workshop on Liquid Crystals and the 11th National Meeting of SICL, 7-9 July 2014, Ravenna, Italy.

[C16] W. Yao, **G. Gilardi**, M. Wale and M. Smit*, "Generic InP-based integration technology: RF crosstalk in high-capacity optical transmitter PICs",* ECIO 2014 - 17th European conference on integrated optics and technical exhibition, 24-27 Jun 2014, Nice, France.

[C15] ***INVITED*** W. Yao, **G. Gilardi**, M. Wale and M. Smit*, "Generic InP-based integration technology: RF crosstalk in high-capacity optical transmitter PICs",* PIERS Progress In Electromagnetics Research Symposium, 25-28 August 2014, Guangzhou (Canton), China.

[C14] **G. Gilardi**, W. Yao, X. Leijtens, M. Smit and M. Wale, "*Thermal crosstalk reduction in InP based integrated circuits*", 18th Annual Symposium of the IEEE Photonics Benelux Chapter, 29-30 November 2013, Eindhoven, The Netherlands.

[C13] W. Yao, **G. Gilardi**, M. Smit and M. Wale, "*Microwave modelling and analysis of an InP based shifter from a generic foundry process*", 18th Annual Symposium of the IEEE Photonics Benelux Chapter, 29-30 November 2013, Eindhoven, The Netherlands.

[C12] ***INVITED*** **G. Gilardi** and M. Smit "Generic InP-based integration technology: present and prospect", PIERS Progress in electromagnetic research symposium, 12 – 15 August 2013, Stockholm, Sweden.

[C11] R.Asquini, **G. Gilardi** and A. d'Alessandro, "*Resonant micro- and nano-structured photonic devices based on composite materials*", NOMA 2013, 10-15 June 2013, Cetraro, Italy.

[C10] **G. Gilardi**, M. Wale and M. Smit "*Thermal crosstalk investigation in an integrated InP multiwavelength laser*", 17th Annual Symposium of the IEEE Photonics Benelux Chapter, 29-30 Nov 2012, Mons, Belgium.

[C09] R. Asquini, R. Beccherelli, **G. Gilardi**, M. Trotta and A. d'Alessandro "*All-optical switching and filtering based on liquid crystals and photosensitive composite organic materials*", SICL 2012, 20-24 June 2012, Roma, Italy.

[C08] **G. Gilardi**, R. Asquini, A. d'Alessandro and G. Assanto, "*An electro-optically tunable Bragg reflector in a liquid crystal waveguide*", OSA2010-Topical meeting on Bragg gratings photosensitivity poling in glass waveguide, 21-24 June 2010, Karlsruhe, Germany.

[C07] **G. Gilardi**, Y. Hasan, S.M. Mohammed, A. d'Alessandro, A. Serpengüzel and R. Beccherelli, "*Tunable integrated optical filters based on sapphire microspheres and liquid crystals*", SPIE Europe 2010, 12-16 April 2010, Brussels, Belgium.

[C06] **G. Gilardi**, D. Donisi, A. Serpenguezel and R. Beccherelli, "*Tunable filter based on sapphire microspheres*", EOS 2009, 27-29 September 2009, Capri, Italy.

[C05] R. Asquini, D. Donisi, M. Trotta, A. d'Alessandro, B. Bellini, **G. Gilardi** and R. Beccherelli, "*Modelling and microfabrication of electro optical liquid crystal waveguide on silicon substrate*", EOS 2008, 29 September - 2 October 2008, Paris, France.

[C04] **G. Gilardi**, R. Asquini, A. d'Alessandro and G. Assanto, "*Electro-optic distributed Bragg reflectors based on liquid crystal*", SICL 2010, June, Cetraro, Italy.

[C03] **G. Gilardi**, R. Asquini, A. d'Alessandro and G. Assanto, "*Riflettore alla Bragg accordabile in guida d'onda a cristalli liquidi*", Fotonica 2010, 25-27 May 2009, Pisa, Italy.

[C02] M. Trotta, **G. Gilardi**, R. Asquini, D. Donisi, Antonio d'Alessandro, B. Bellini and R. Beccherelli, "*Gate ottico a cristallo liquido su silicio microlavorato ad alto rapporto di estinzione*", Fotonica 2009, 27-29 May 2009, Pisa, Italy.

[C01] **G. Gilardi**, D. Donisi and R. Beccherelli, "*Filtro sintonizzabile basato su microrisonatori sferici e cristalli liquidi*", Fotonica 2009, 27-29 May 2009, Pisa, Italy.

Eindhoven, 05 April 2015

Signature: Giovanni Gilardi