



Newsletter: Spring 2018

Welcome to the third newsletter of the IEEE Photonics Society Benelux Chapter. In this newsletter:

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1. Recently defended PhDs

Régis Hontinfindé – Frequency-resolved distributed measurement applied to supercontinuum generation in optical fibres – UMONS – University of Lille (PhLAM)

Supervisors – Prof. Marc Wuilpart and Prof. Majid Taki



Summary – In the frame of this thesis, UMONS and PhLAM collaborated on the development of an experimental setup that aims to perform distributed (spatially-resolved) measurement of supercontinuum generation (SCG) along an optical fiber. Results about the measurement of distributed SCG along HNL fibers with a 6 m resolution using a modified OTDR (Optical Time-Domain Reflectometer) have been obtained. The conventional OTDR used in the setup was then replaced by

a photon-counting OTDR in order to get a better spatial resolution (14 cm).

Alonso Millan Mejia - Development of IMOS technology for a high bandwidth modulator - TU Eindhoven

Supervisors: Dr. Jos van der Tol and Prof. Dr. Meint Smit



Summary - This work aims to investigate the slot waveguide modulator based on an electrooptic polymer in the IMOS platform. For this we have divided the work into three main sections. The first one covers the technology used. The second one presents several passive devices needed to obtain a high-performance optical modulator in a MZI structure. These devices also increase the functionality of the IMOS platform. The third one covers the optical modulator based on ring resonator and MZI structures.

2. Starting PhDs

Nazila Safari Yazd – Development of plasmonic optical fibre grating sensors – UMONS

Supervisors – Prof. Patrice Mégret and Prof. Christophe Caucheteur



Summary – Fiber Bragg gratings (FBGs) possesses numerous applications from optical fiber telecommunication to extensive variety of optical fiber sensors. The reason of this success lies in its unique properties such as small size, light weight, immunity to electromagnetic interferences, low loss, high sensitivity, fast response, remote operation capability and potential for distributed sensing. The PhD thesis partially concerns the investigation of thermal sensing that includes inscription of FBGs on different type of optical fibers (DRAKA Band Bright, FiberCore PS 1250/1500 (Ge/B), SMF28(G652), with/without hydrogen loading) by using different setups. Regenerating gratings by thermal process are one option to operate at high temperatures. During the annealing process the original seed Bragg grating is erased and a further heating creates a new refractive index modulation. In the frame of this thesis, regenerated Bragg gratings will be intensively studied for high temperature sensing. Another tasks concern the development of PH, humidity and acceleration sensors.

Maxime Lobry – Characterization of optical fibre biosensors – UMONS

Supervisor – Prof. Christophe Caucheteur



Summary – The subject of the thesis will be included in the CHARMING (Carbon nanomaterial enHanced optiCAI fibRes for bioMedical Imaging and seNSinG) project. CHARMING's objective is to develop a new technological platform for applications in the field of biomedical sensing and imaging. The aim is to exploit the exceptional properties of graphene and carbon nanotubes to produce novel optical fibre plasmonic biosensor devices and novel fibre based second harmonic generation microscopy probes for detecting and visualizing cancer cells with unprecedented sensitivity. More specifically, CHARMING will research into nanocarbon equipped optical fibres enabling the detection of down to 10 cancer cells as well as imaging of proteins in a tumorous environment with a 10-fold better sensitivity compared to current systems. By delivering this technology, CHARMING aims to contribute to the advent of advanced fibre-based tools empowering early in-vivo cancer diagnosis. The subject of the PhD research will fit in activities pertaining to the optical fibre-based carbon nanomaterial-enhanced plasmonic bio-detection part of CHARMING with the spectral characterization and the optimization of the demodulation process of the biosensor's response.

Sander Reniers– Novel building blocks for InP membrane nanophotonics - TUE.



Supervisor: Dr. Yuqing Jiao and Dr. Jos van der Tol

Summary – This research project looks at the next steps in the development of the InP membrane platform, which enables nanophotonic circuits in a highly confined membrane layer. The

successful applicant will explore the unique possibilities of this platform, using the strong interaction of the guided modes with materials. The project will first focus on extending the capabilities of the platform by optimizing the most important passive components of the platform and adding a novel component to it: a polarization converter, which is a key component in many applications. As a next step the PhD will investigate the integration of a novel wide-band electro-absorption modulator, that has been invented in the group. He will deeply investigate the challenges in material epitaxy and process technologie. He will investigate the compatibility of the novel components to the full membrane platform. This project is part of the research activities of the InP membrane team.

Niall Kelly (postdoc) - Wafer-scale active-passive integration on an InP membrane - TUE

Supervisor: Dr. Yuqing Jiao and Dr. Jos van der Tol

Summary – In the Photonic Integration group at TU Eindhoven, active research is done on



exploring the next generation PICs: a photonic membrane platform to obtain a revolution in performance. The key idea is to detach the photonic layer from the substrate. This results in enhanced optical confinement in the waveguide (implying a much higher integration density), miniaturized device spot size (leading to faster operation speed and lower energy consumption) and possibility to integrate with CMOS electronics (giving reduced packaging cost). The postdoc will explore the essential technologies required for the InP membrane platform, with a focus on processing InP-based circuits on top of a silicon or (Bi)CMOS

wafer. He will work closely with other team members on the IMOS project to construct a reliable process flow, which integrates membrane lasers, ultrafast detectors and modulators. Based on the developed process flow, multi-project wafer runs on this platform will be initiated. For this the postdoc will make building block descriptions, which designers can use to define photonic circuits.

3. New faculty

Dr. David Marpaung, Assistant professor, MESA+ Institute, U Twente

David Marpaung received his Ph.D. degree in electrical engineering from the University of Twente, the Netherlands in 2009. From 2009 to 2012 he was a postdoctoral researcher in the University of Twente within the framework of the European Commission FP7 funded project SANDRA, working on microwave photonic system integration for optical beamforming. He joined CUDOS University of Sydney, Australia in August 2012 as a research fellow. From 2015 to 2017 he was a senior research fellow leading the nonlinear integrated microwave photonics research activities in CUDOS University of Sydney. In January 2018 he joined the Laser Physics and Nonlinear Optics group University of Twente as an assistant professor.

He was the recipient of the 2015 Discovery Early Career Research Award (DECRA) from the Australian Research Council and the 2017 Vidi award from the Netherlands Organisation for Scientific Research (NWO). His research interests include RF photonics, photonic integration, nonlinear optics, and phononics.

4. Invited talks

1. Christophe Caucheteur , “Immunosensing Using Narrowband Cladding Mode Resonances”, BGPP 2018, Zurich, Switzerland, July 2018.

2. Weiming Yao (TU/e), “III-V Photonic Integrated Circuits for Telecoms and Beyond”, at PIC International 2018, Brussels.
3. Sonia M. García-Blanco (UT), “Al₂O₃ Microresonator Based Passive and Active Biosensors”, ICTON 2018, Bucharest.
4. Sonia M. García-Blanco (UT), “Al₂O₃ Microresonators for Passive and Active Sensing Applications”, OSA Advanced Photonics Congress, Optical Sensors, 2018, Zurich.

5. Awards:

1. Meint Smit received the IPRM Award at the 2018 Compound Semiconductor Week (CSW), which was held in the Samberg Center at MIT, Cambridge, MA, from May 29- June 1. [CSW is the result of merging the Indium Phosphide and Related Materials (IPRM) and the International Symposium on Compound Semiconductors (ISCS)].

6. Upcoming events:

1. ISLC 2018 in Santa Fe, US. Erwin Bente from PhI group at TU/e will organize a workshop on low noise semiconductor lasers. Conference dates: 16-19 September 2018; submission deadline: 21 May 2018. Website: <http://ieee-islc.org/>
2. ECIO 2018 in Valencia, Spain. Conference dates: 30 May – 1 June 2018. Website: <http://www.ecio-2018.org>
3. Photonics Event, Enschede. Date: 19th June 2018. Website: <https://photonics-event.nl/>
4. World Technology Mapping Forum, Integrated Photonics: <https://worldtechnologymappingforum.org/>

7. “Women in Photonics” Events

1. Women in Photonics Lunch: Photonics Event, Enschede. Date: 19th June 2018.

8. Relevant publications/ roadmaps:

1. The JePPIX Roadmap 2018 for InP and TriPleX-based Photonic Integration has been published and is available at the JePPIX website www.jeppix.eu
2. JSTQE special issue on Indium Phosphide Integrated Photonics published at <https://ieeexplore.ieee.org/xpl/tocresult.jsp?isnumber=7985001&punumber=2944>, Kevin Williams from PhI group at TU/e is the primary guest editor of this special issue.

9. Vacancies:

1. Dean of the faculty of science and technology, UT (<https://www.utwente.nl/en/organization/careers/vacancy/!/dean-of-the-faculty-of-science-and-technology/208665>).
2. PhD position on photonics-based measurement systems, PhI group, TUE (<https://jobs.tue.nl/en/vacancy/phd-position-on-photonicsbased-measurement-systems-337093.html>).
3. PhD position on semiconductor photonic integrated lasers and circuits, PhI group, TUE (<https://jobs.tue.nl/en/vacancy/phd-position-on-semiconductor-photonic-integrated-lasers-and-circuits-337066.html>).
4. PhD Position on Thermal and Microstructural Simulation of Laser-Based Large Scale Additive Manufacturing, Laser Processing group, UT

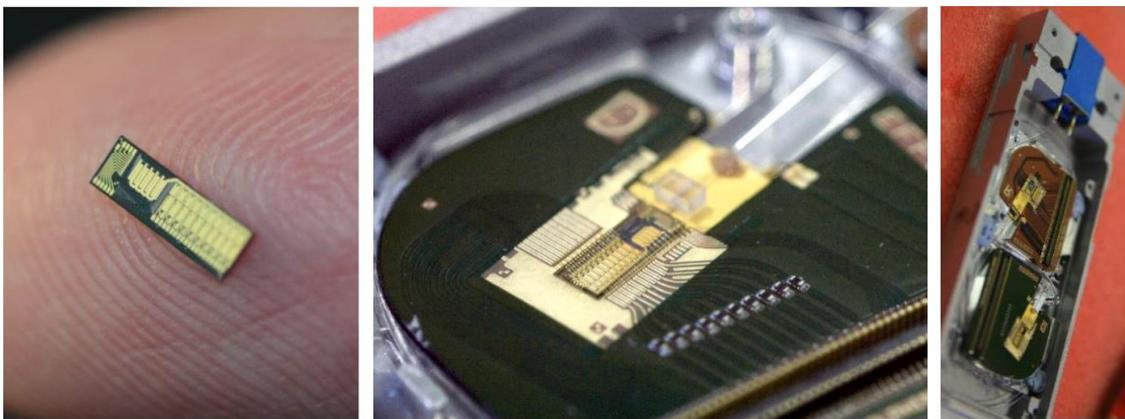
(<https://www.utwente.nl/en/organization/careers/vacancy/!/phd-position-thermal-and-microstructural-simulation-of-laser-based-large-scale-additive-manufacturing/117424>).

5. PhD Position on Control of Laser-Based Large Scale Additive Manufacturing, Laser Processing group, UT

(<https://www.utwente.nl/en/organization/careers/vacancy/!/phd-position-control-of-laser-based-large-scale-additive-manufacturing/108815>)

Founded in 2010, EFFECT Photonics delivers highly integrated optical communications products based on its Dense Wavelength Division Multiplexing (DWDM) optical System-on-Chip technology. As a spin out of Technical University of Eindhoven (TU/e), EFFECT Photonics takes a platform approach to integration using high-yielding building blocks within the wafer. The key enabling technology for DWDM systems is full monolithic integration of all photonic components within a single chip and being able to produce these in volume with high yield at low cost.

EFFECT Photonics develops and delivers highly integrated optical products based on InP which is the material of choice for creating efficient laser light sources, waveguides, modulators, and photodiodes used in optical communication systems throughout the world. With this capability, EFFECT Photonics is addressing the need for low cost DWDM solutions driven by the demand for high bandwidth connections between data-centers and back from mobile cell towers.



Effect Photonics has recently announced several vacancies, including Photonic Integrated Circuit Design Engineer, Opto-mechanical Design Engineer, Software Developer, Test and Measurement Engineer, Project Manager, Assembly and Test Operator. We accept open applications as well.

Are you talented and interested to work in a knowledge- and technology-driven company with a multi-cultural environment? Visit www.effectphotonics.nl or scan the QR code to see more information and the latest vacancies.

