

VACANCY FOR ELECTRONICS ENGINEER FOR PROTOTYPING PHOTONIC SYSTEMS

Ghent University – IMEC, Photonics Research Group
Tech Lane Ghent Science Park – Campus A
Technologiepark – Zwijnaarde 126, B-9052 Gent, Belgium

The Photonics Research Group is active in the field of integrated photonics. This is the field in which optical and photonic functions are implemented in the form of an integrated circuit, similar to how electronic functions are implemented. Such Photonic Integrated Circuits (PICs) are used in large numbers in optical datacommunication and telecommunication. In recent years the application span has broadened dramatically to include LIDAR, medical devices, optical fiber sensors, optical computing and more.

Invariably a photonic IC is surrounded by an electronic system. Therefore application-oriented work – leading to system prototypes – also encompasses electronic design and system implementation. This is the context of the present vacancy.

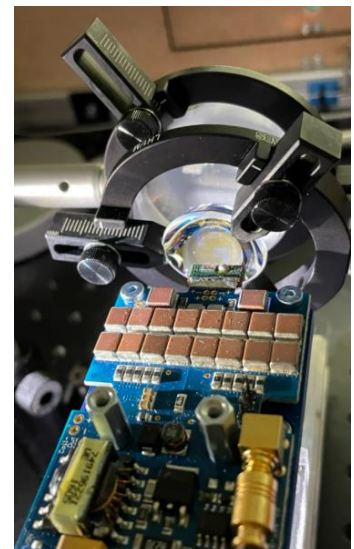
JOB DESCRIPTION:

The candidate will work closely with photonics researchers to co-develop prototypes of innovative photonic systems. He/she will design and build the electronic hardware (analog and digital) of the prototype and will also develop the (embedded) software for control and data readout. Examples of projects that will be addressed include: an optical system for rapid identification of bacteria in blood samples (geared towards use in low-income countries), a point-of-care medical device (based on photonic ICs) for early diagnosis of cardiovascular diseases, spectroscopic systems for identification of pollutants in water etc.

PROFILE:

The candidate has a master degree in electronic engineering (or 4-year bachelor degree) and has hands-on experience with electronic design and build. More specifically he/she combines as many as possible of the following knowledge elements and skills:

- Analog electronic design
 - Strong affinity with analog design, typically depending on multiple design constraints including e.g. high bandwidth or low SNR. Preferably also some affinity with designs that partly includes RF or high-speed applications (or co-develop a system together with RF experts).
 - Knowledge of amplifier design – inverting, non-inverting, differential, transimpedance topologies, ... is a must.

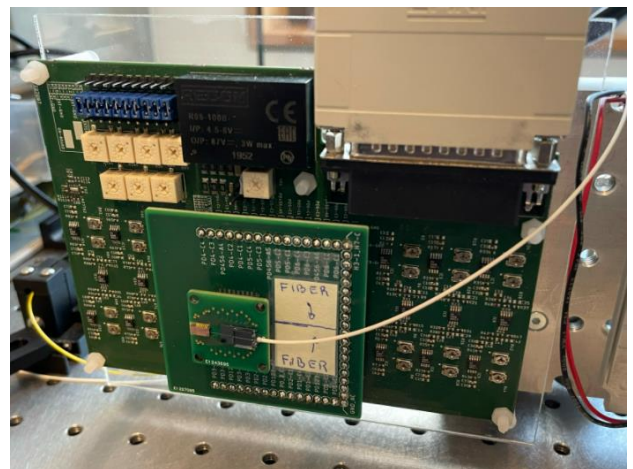


This picture shows a typical commercial driver board for pulsed laser diodes. We have designed multiple driver boards that can be controlled by a single microcontroller PCB, and these boards need to be populated and tested.

- Experience in designing laser diode and LED-driving circuitry as well as in transimpedance amplifier design.
- Analog filtering.
- Analog-to-digital and digital-to-analog conversion systems (existing, on-chip IC's, e.g. Analog Devices' ADC and DAC IC's).
- Experience simulating analog electronic designs using simulators (e.g. SPICE).
- Experience in layout of these analog electronics on printed circuits board, keeping in mind the targeted application (e.g. Altium Designer, EAGLE).
- Digital electronic design
 - Experience with microcontroller development, both with existing development boards and with systems designed yourself (PCB's).
 - Experience with other embedded systems (SOC's, e.g. Raspberry Pi, ESP-32) is a plus.
 - Experience designing these digital electronics on printed circuits board, keeping in mind the targeted application (e.g. Altium Designer, EAGLE).
- Software development
 - In relation to microcontroller development: experience in embedded software: C/C++.
 - STM32: Keil/Atollic/STM32IDE
 - Visual studio
 - Arduino
 - ...
 - Develop basic-level software to transmit sensor/actuator data processed by the microcontroller/embedded system in a bigger system (PC) using various protocols (USB, UART, WiFi, ...), using appropriate programming languages.

Prototyping skillset

- Affinity and agility, especially in the context of prototyping work (proof-of-concept, using off-the-shelf development boards, breadboard circuit building, ...).
- Experienced in assembling small-quantity PCB's (soldering/hot air rework/ reflow soldering) by yourself.
- Having know-how of various (additive and subtractive) manufacturing methods in order to evaluate the most suitable one for a given project. Typically, these include custom pieces of mounting hardware (e.g. milled in aluminum) or brackets and adapters (e.g. 3D-printed parts). You are able to select the suitable method for the given application.
- Knowledge of a 3D-CAD(CAM) package (Fusion360, SolidWorks, Inventor, ...) is a plus.



This picture shows the PCB for multi-channel laser Doppler vibrometer and multiple transimpedance amplifiers designed for MHz signal bandwidth.

Others

- Ability to plan ahead. From time to time, research and prototyping work on the bigger system happens concurrently. You should be able to anticipate possible problems and discuss them with your colleagues doing the research.
- Being able to do the prototyping work independently. You interact with colleagues from the Photonics Research Group discussing requirements or high level features. However, it is expected that you're able to do the prototyping work yourself.

APPLICATION:

Apply online at <http://photonics.intec.ugent.be/contact/vacancies/Application.htm>

MORE INFORMATION:

Contact: prof. Roel Baets (roel.baets@ugent.be)

ABOUT THE PHOTONICS RESEARCH GROUP

The Photonics Research Group (about 90 people) is part of the Department of Information Technology of Ghent University and is associated with IMEC. The group is chaired by Prof. R. Baets and has been active in integrated photonics research for many years. The other professors in the group are P. Bienstman, W. Bogaerts, S. Clemmen, B. Kuyken, N. Le Thomas, Y. Li, G. Morthier, G. Roelkens, K. Van Gasse and D. Van Thourhout. The main research directions are silicon photonics, heterogeneous integration, optical communication and computing, photonic (bio)sensors and photonic integrated circuits for biomedical applications in the near-infrared and mid-infrared wavelength range.