light sources (particularly lasers) into these circuits is a long sought goal, both for completing their functionality with one or several light sources and as a manufacturing approach for lasers on large wafers in CMOS-fabs. Also other optical functions such as optical isolators are key building blocks for complex photonic systems. In this presentation we will outline the current status of the silicon photonics platform and we will discuss various types of smart material combinations to extend the functionality of the integration platform. We will elaborate on the heterogeneous integration of III-V semiconductors (for integrated light sources and photodetectors, both at telecommunication wavelengths and the short-wave infrared) and magneto-optic materials (for optical isolation).

11.30-11.50 uur
Room 8

Silicon Photonics and the open IPKISS design framework
Wim Bogaerts, Ghent University-imec, Center for Nano-and Biophotonics, Belgium

We will present a view on how the complexity of Silicon photonics poses new photonic design challenges, and how the open IPKISS framework provides an avenue to address these.
Silicon Photonics has become one of the fastest growing fields in integrated photonics, driven by a strong push for technologies that enable complex photonic functionality for efficient short-range optical interconnects and optical sensing platforms. From a technological point of view, silicon photonics offers the relevant building blocks, up to recent demonstrations of heterogeneously integrated III-V laser sources. The technology also allows extreme miniaturization of photonic components, which in turn enables compact chips, but more important, complex photonic circuits. As in electronics, complexity can significantly boost performance of entire circuits, even when individual building blocks are not the best-in-class. However, this complexity also presents a serious challenge: Reliably designing complex photonic circuits is not straightforward, and there is no single suite of tools that provides a comprehensive design solution. The vast mismatch in physical time scales (THz) and operational time scales (kHz to GHz) and the complex (multiphysical) dynamics make it difficult to capture all photonic effects in efficient models, and often requires multiple disjoint tools to simulate photonic components and circuits with confidence. IPKISS provides a script-driven design framework that can link up multiple tools from a description of a photonic component, and can generate physical layout, electromagnetic simulation, mode solving and circuit simulation. IPKISS is also vendor-agnostic and open-source, and communicates with established simulation tools such as MIT's MEEP simulator.

12.00-12.20 uur
Room 8

Innovative sensor technology for the (drinking) water industry
Marcel Klein Koerkamp, Optisense

The sensing platform of Optisense is based on an integrated optic Mach-Zehnder Interferometer. Starting from the initial design Optisense has re-engineered the sensor to its current format resulting in a simple design that is easy to process with high yield and consistent performance. Using an on-chip modulator a serrodyne detection format is used to track minute changes in the phase reading of the sensor.
Based on this sensing platform Optisense is developing via its subsidiary Optiqua, in close collaboration with launching partners Vitens (largest drinking water utility in the Netherlands) and PUB (national water agency of Singapore), innovative sensor systems to serve the specific needs of the (drinking) water industry.
EventLab is an on-line monitoring system for identifying compositional changes in the water matrix. It is based on tracking changes in the bulk refractive index of the water in combination with event detection algorithms to identify abnormal changes (events) in the pattern of natural variation present at the location of installation. A demonstration project consisting of a small scale network of EventLab sensors is currently running in the province of Friesland.
The MiniLab system is a target detection system based on grab sample analysis. Biochemical interfaces are applied to provide the selectivity and sensitivity required for detecting relevant priority substances. A prototype system is developed that allows decentralized analysis of water samples thus bringing quality monitoring and quality control closer to the water purification and production facilities.

Room 9

Optical Communication

Optical communication has become the key enabler of the World Wide Web. High speed trunk line connections already transport Terabits of information. As the demand for transmission capacity grows with exponential figures, new challenges are put forward to increase the transmission capacity at least with three orders of magnitude. In the meanwhile fiber optics penetrates buildings, offices and the premises of local residents offering bandwidths up to 1 Gbit/s and more. These application domains require low cost solutions with cheap easy-to-handle fibre network solutions featuring polymer fibres in combination with advanced data formats. At last, cars and airplanes take more and more advantage of fibre optic data planes for leasure, monitoring and control (fly-by-wire).

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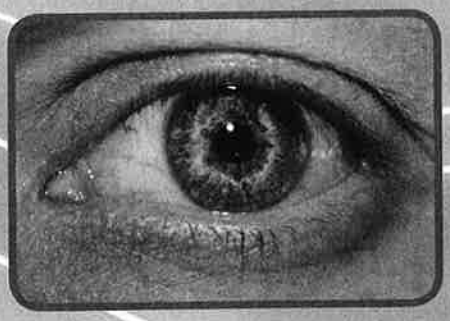


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