



Photonic Biosensors for Point-of-Care Applications

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Abstract:

In recent years, there have been several examples of serious virus outbreaks raising significant fears that such outbreaks can rapidly spread worldwide to become pandemics with devastating effects on populations and their social and economic development. Therefore fast, on-site, and sensitive detection of viruses is essential in detecting the onset of viral epidemics and preventing their spread. Currently available methods such as PCR and ELISA used for detection of viruses and other analytes, are time-consuming, expensive and require labor-intensive sample preparation and trained personnel for their operation. This has been the motivation behind the increased interest for the development of alternative virus/analyte detection methods. In this invited keynote, I will talk about research, development and commercialization of Lab-on-a-Chip photonic biosensors and their application for sensitive, rapid and multiplex detection of various analytes such as micro-organisms (viruses and bacteria) and biomarkers (proteins and DNA/RNA molecules). These biosensors can be applied in various application areas such as health care, e.g. for early diagnosis of cancer and heart diseases, food industry, e.g. for sensitive and fast detection of antibiotics in dairy products, national security, environmental monitoring, process technology, etc. The high sensitivity that photonic biosensors can achieve could result to less sample pre-concentration handling, which contributes to faster analysis and savings on operational costs. Moreover, these biosensors are easy-to-use and compact, offering the possibility for development of portable/handheld devices. As such, photonic biosensors are excellent candidates for fast, point-of-care analyte detection.

Biography:

Aurel Ymeti is cofounder and CEO of Nanoalmyona BV, a high-tech Dutch company specialized in research and technology development, project management and new business development in Hightech Systems and Materials, including integrated



photronics, Lab-on-a-Chip biosensing, optoelectronics, microscopy, and nanomedicine. He earned his MSc in Theoretical Physics from the University of Tirana, Albania in 1996, and his Ph.D. in Applied Physics/Nanotechnology from the University of Twente, Netherlands in 2004, working on the development of ultrasensitive multichannel integrated photonic (bio-)sensing platforms. Subsequently, he worked as a postdoctoral research fellow at the same university on development of portable devices for staging of HIV infection in point-of-care settings, later commercialized by Immunicon/Veridex (J&J). In 2008 Aurel cofounded Ostendum, a spin-off company of the MESA+ Institute for Nanotechnology of the University of Twente, focusing on the commercialization of extremely sensitive and label-free optical analysis methods for rapid detection of micro-organisms and biomarkers based on the Lab-on-a-Chip Nanotechnology, initially invented and developed by Aurel during his Ph.D. project. As CTO at Ostendum, he was responsible for the research and technology development, product management and new business development.

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