

## 2<sup>nd</sup> International Conference and Exhibition on Lasers, Optics & Photonics September 08-10, 2014 Hilton Philadelphia Airport, USA

## New functionalities in optical fibers using "Lab on Fiber" technology

Andrea Cusano University of Sannio, Italy

Optical fibers technology has experienced a tremendous growth and advancement over the past several decades, not only in transmission systems for communications (where nowadays totally dominate especially at the high performances level) but also in the sensing field. For this reason, there is an ever increasing need to add new functionalities and improve the performances, through the integration on the optical fibers of advanced functional materials providing the control and manipulation of light at nanoscale. "Lab-on-Fiber" technology may constitute a valid solution to satisfy this ever increasing request for advanced photonic devices, components and systems. "Lab on Fiber" is indeed an emerging field envisioning a novel class of advanced, multifunctional photonic devices and components arising from the integration onto optical fibers of different materials at micro and nano-scale with suitable physical, chemical and biological properties. This new fascinating and intriguing research field thus proposes a new technological platform where functionalized materials, devices and components are constructed, embedded all together in a single optical fiber providing the necessary physical connections and light matter interaction, exploitable in both communication and sensing applications. This technological innovation would open the way for the creation of a novel technological world completely integrated in a single optical fiber conferring unique and unprecedented performances and functionality degree. This lecture reviews the strategies, the main achievements and related devices in the "Lab on Fiber" roadmap discussing perspectives and challenges that lie ahead.

## **Biography**

Andrea Cusano received Laurea degree cum Laude in Electronic and Telecommunication Engineering and PhD in Optoelectronics from University of Naples (Federico II, Italy). He is currently Associate Professor at the Engineering Department of University of Sannio where he and Prof. Cutolo co-founded the Optoelectronic Group since 2002. He has published over 120 journal articles and 150 refereed conference communications related to the development of new fiber optic and photonic sensors for physical, chemical and biological sensing applications. In this context, he has also co-authored more than 10 chapters published in international books and invited papers in international journals and is co-editor of 2 Special Issues. He is Co-Editor of 4 international books - 'Fiber Bragg Grating Sensors: Recent Advancements, Industrial Applications and Market Exploitation' 2010, 'Selected topics on Photonic crystals and Metamaterials' 2011, 'Photonic Bandgap Structures: Technological Platforms for Physical Chemical and Biological Sensing' 2012, 'Optogemical Nanosensors' 2012. He currently has 4 international patents with major industrial companies (Ansaldo STS, Alenia WASS, Optosmart and MdTEch) and more than 10 national patents. He actually serves as Editor-in-Chief of the Journal of Optics and Laser Technology and as Associate Editor for the Journal of Sensors, The Open Optics Journal, Sensors and Transducers Journal, International Journal on Smart Sensing and Intelligent Systems, Photonic Sensors. He is cofounder of two spin-off companies "OptoSmart S.r.I." (2005) and "Optoadvance" (2011) and has been consultant for major companies of the Finmeccanica group such as Ansaldo STS and Alenia WASS.

a.cusano@unisannio.it