# SEMINAR

**Center for Advanced Research in Photonics**
**&**
**Department of Electronic Engineering**
**The Chinese University of Hong Kong**

## Recent progress in distributed fibre optics sensing towards centimeter spatial resolution

by

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**Date :** 28th October 2009 (Wednesday)
**Time :** 2:00 p.m
**Place :** Rm 222 Ho Sin Hang Engineering Building, CUHK

**Abstract**
Fibre optics sensors have recently gained a lot of interest regarding their capability to perform distributed measurements over many tens of kilometer of fibre. This type of sensors informs continuously about a quantity to be measured such as temperature or strain at any position along the fibre, directly providing a map of the measured quantity as a function of distance. This capability is particularly attractive for monitoring large structures such as pipelines, bridges or tunnels. Sensors using the nonlinear optical effect named stimulated Brillouin scattering offer the best accuracy over the longest distance to date, but suffer from an inherent limitation to a meter spatial resolution. We shall present recent works based on a novel approach circumventing this physical limitation and making possible a drastic improvement in the spatial resolution down to a centimeter spatial resolution, directly competing with fibre Bragg gratings. This opens a totally new field in fibre optics through the generation of optically dynamic gratings that can be randomly positioned. We shall show very recent results demonstrating the huge potentiality of this novel approach for signal processing and optical storage.

**About the Author**
Luc Thévenaz received the M.Sc. degree and the Ph.D. degree in physics from the University of Geneva, Switzerland. In 1988 he joined the Swiss Federal Institute of Technology of Lausanne (EPFL) where he currently leads a research group involved in photonics, namely fibre optics and optical sensing.
Research topics include Brillouin-scattering fibre sensors, slow & fast light, nonlinear fibre optics and laser spectroscopy in gases. He achieved with his collaborators the first experimental demonstration of optically-controlled slow & fast light in optical fibres, realized at ambient temperature and operating at any wavelength since based on stimulated Brillouin scattering. The first negative group velocity of light in optical fibres was also realized in his lab using this approach.
During his career he stayed at Stanford University, at the Korea Advanced Institute of Science and Technology (KAIST) and at Tel Aviv University. In 2000 he co-founded the company Omnisens that is developing and commercializing advanced photonic instrumentation. He is Chairman of the European COST Action 299 "FIDES: Optical Fibres for New Challenges Facing the Information Society" and is in the Consortium of the European FP7 project "GOSPEL: Governing the speed of light".

***** All are welcome to attend *****

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