2026 Young researchers biophotonics winter meeting

February 18th. 15.00-17.30

15:00–15:10 **WELCOME Vision Science Committee @SEDOPTICA**
Mikel Aldaba | Polytechnic University of Catalonia, Spain

15:10–16:00 **KEYNOTE SPEAKER**
Coherence gating in support of technology for imaging the eye
Adrian Podoleanu | University of Kent, Canterbury, UK
Discussion

Moderator. Alba Paniagua | University of Castilla-La Mancha, Spain

16:00–16:45 **BIOPHOTONICS ENGINEERING**
Beyond Corneal Maps: Deep Learning Fusion of Scheimpflug Images and Topography for Keratoconus Detection
Juan Casado Moreno | University of Zaragoza, Spain
Experimental Implementation of Artificial Intelligence Techniques for the Optimization of Optical and Visual Quality Measurements in the Human Eye
Juan Sebastian Ramirez Quintero | University of Antioquia, Colombia
Estimating IOL position in cataract surgery using eigeneyes and machine learning algorithms
Javier Rodríguez Sánchez | Instituto de Óptica "Daza de Valdés" CSIC, Spain

Moderator. Mikel Aldaba| Polytechnic University of Catalonia, Spain

16:45-17:30 **CLINICAL APPLICATIONS**
Foveal neural contrast sensitivity remains stable until late adulthood
Sara Silva Leite | Carl Zeiss Vision International GmbH, Germany
Chromatic properties of diffractive optics: clinical implications in vision
Laura Clavé | Polytechnic University of Catalonia, Spain
The role of visual performance and the impact of induced vision impairment on fine motor skills.
Pilar Granados Delgado | University of Granada, Spain

Moderator. Clara Mestre | Polytechnic University of Catalonia, Spain

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Coherence gating in support of technology for imaging the eye

Adrian Podoleanu

Applied Optics Group

University of Kent, Canterbury, UK

More than 50% of all reports on optical coherence tomography (OCT) are dedicated to imaging the posterior and anterior chamber of the eye. The lateral resolution in the eye is determined by the focusing capability of the interface optics while in depth, resolution is determined by the principle of coherence gating.

In Kent, as early as 1996, we have started OCT by creating *en-face* views of the retina based on time domain coherence gating. Then for almost 10 years, interest on *en-face* views disappeared until the spectral domain method reached sufficient acquisition speed, to enable production of volumes of retina tissue in less than a few seconds. The imaging technology evolved based on Fourier Transforms delivering A-scans. Based on A-scans, an *en-face* slice cannot be created until all volume of A-scans is assembled. In case a single or a few *en-face* views are needed, we introduced a different coherence gating, based on the principle of leader follower (LF) (former denominated as Master Slave). Coherence gating is enabled for each depth of interest in the tissue. Such coherence gating delivers signal for the depth of interest without the need to produce a whole A-scan.

Recently, we applied the LF protocol to bidirectional sweeping lasers as well as to ultra fast swept sources, exceeding tens of MHz, producing *en-face* slices in real time. LF coherence gating is also an ideal procedure for coherence revival due to its tolerance to dispersion.

A last example will be given with a Shack – Hartmann coherence gating where coherence gating can add depth resolved capabilities in assessing the aberrations and potentially enable aberration correction customised for each layer in depth in the tissue.

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Adrian Podoleanu (Fellow of the Royal Academy of Engineering, of the Institute of Physics, of Optica, of SPIE and an International Fellow of Chinese Optical Society) is the Head of the Applied Optics Group, Professor of Biomedical Optics in the Department of Engineering, Mathematics and Physics, University of Kent, Canterbury, UK, an investigator of the Biomedical Research Centre, University College London (UCL) and Institute of Ophthalmology and honorary professor in the UCL and in the University of Medicine and Pharmacy, Timisoara. He received the Ph.D. degree in Electronics from the Electronics and Telecommunications Faculty, Technical University of Bucharest in 1984. He was a founder member of the Romanian Chapter of SPIE and its first Chairman (1992). He has obtained the first *en-face* OCT images from the retina in the human eye and reported the first combined OCT/SLO instrument. Currently he serves as the Associate Secretary of the International Commission for Optics.

AWARDS: Order of the Crown, officer, Royal House of Romania, 2017; Royal Society Wolfson Research Merit Award 2015; European Research Council, Advanced Research Fellowship, 2010-2015; Ambassador's Diploma, Embassy of Romania in the UK, 2009; Leverhulme Research Fellowship, 2004 – 2006; Romanian Academy "Constantin Miculescu" prize for research in Lasers and Nonlinear Optics, 1984.