



# IEEE Okanagan Subsection Presents

Prof. G. Bora Esmer

Marmara University and The University of British Columbia

## **Fundamentals of Holography, Fast Computation of Computer-Generated Holography and Super-Resolution in Digital Holography**



**Time & Date:** 5pm-6pm, Monday June 3, 2013

**Location:** EME 1203, UBC Okanagan campus

**Talk Abstract:** Holography is a three-dimensional (3D) visualization technique that satisfies all the depth-cues. It paves the way for obtaining an optical replica of a captured 3D scene by regenerating the diffracted waves from that scene. Holography is employed in vast amount of application areas, such as in optical computing, optical metrology and microscopy, non-destructive testing and 3D imaging. Dynamic holographic reconstructions can be achieved by employing digital holographic video displays which are pixelated devices. In practice, spatial light modulators (SLMs) are used in such purposes. The pixelated structure of SLMs can affect the quality of reconstructed objects. Hence, in order to obtain better reconstructions, pixelated structure of SLMs has to be taken into consideration. Rapid calculation of the diffraction field which is emitted by the object is just as important as the accuracy of the diffraction field. In digital holography, diffraction field of a 3D object can be captured by devices formed as arrays of sensors. Although, capturing high resolution diffraction field paves the way for reconstructing objects with sharper edges and wider viewing angles, there are some imposed limitations on the capturing devices. For instance, when the sizes of sensors are decreased, power of the captured light will drop, and conversely power of the shot noise will increase. Hence, the quality of the captured pattern may be plummeted. With the aim to capture high resolution diffraction fields, super-resolution algorithms can be used.

**Speaker Biography:** G. Bora Esmer received his Ph.D. degree in Electrical and Electronics Engineering in 2010 from Bilkent University, Turkey. He worked as an instructor in Bilkent University for the following semester. In 2011, he joined the faculty of Engineering at Marmara University in Istanbul, Turkey. He is currently an Assistant Professor in the Department of Electrical and Electronics Engineering at Marmara University. He visited the Tampere University of Technology and The University of British Columbia in 2012 and 2013, respectively. His research interests are in the areas of 3D visualization techniques, digital holography and computer-generated holography. He is a member of IEEE and OSA.

**Refreshments** will be provided. For further information please contact:  
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