Posting Detail

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Title :	(Updated) (Reminder) Distinguished Lecture on Development of a 2-D Electro-Optic scanner for potential endoscope application by Prof. Wei-Chih Wang, The University of Washington
Body :	

Department of Electronic Engineering
&
State Key Laboratory of Millimeter Waves (Hong Kong)

IEEE AP/MTT HK Joint Chapter

Distinguished Lecture on

Development of a 2-D Electro-Optic scanner for potential endoscope application

By

Prof. Wei-Chih Wang
The University of Washington

Date ***: 09 May 2011 (Monday)***
Time ***: 04:30 p.m. – 05:30 p.m.***
Venue ***: Room G 6302, 6/F, Green Zone, Academic Building, City University of Hong Kong***

Abstract
Technological advancements in endoscopy design are in current development due to the increased demand for minimally invasive medical procedures (MIMPs). One such advancement is reducing the overall size of the endoscope system while maintaining the resolution and field-of-view (FOV). Reduction of size results in less tissue damage and trauma during operation as well as faster recovery times for patients. Additionally, areas that are inaccessible by today's endoscope designs will be possible to examine. Current endoscopes use either a bundle of optical fibers (optical waveguides) and/or one or more cameras having an array of detectors to capture an image. Thus, the diameter of these devices employed for remote imaging cannot be reduced to smaller than the image size. Even if one ignores additional optical fibers used for illumination of a region of interest (ROI), the scope diameter is therefore limited by the individual pixel size of a camera or by the diameter of optical fibers used to acquire the image. Therefore, it is apparent to achieve scopes with less than 3 mm overall diameter using current technologies, resolution and/or FOV must be sacrificed by having fewer pixel elements.

Electro-optical scanning offers a sensitive and accurate method to capture images of physical and biological tissues. In addition, the minute physical size of the imaging system is a much needed advantage over conventional imaging systems.

In this talk, a new endoscopic electro-optic scanning system using an array of integrated polymer waveguides, gratings and electro-optic beam steering devices will be presented. The beam deflection is accomplished through the use of an electro-optic medium where the index is changed by an externally applied electric field. An electro-optic polymer with low absorption wavelength peal in the visible band and high optical nonlinearity has been developed for this application. Micro and nano fabrication techniques have been utilized for creating the polymer based optical components. Successful commercial development of a fully integrated optical scanner that can fit inside endoscopic tubes with diameter of less than few mm has the potential to change in the state-of-the-art of clinical endoscopic imaging. A reduction in diameter and the unique ability to directly control the direction of the beam will enable users to examine areas anatomically inaccessible by currently available endoscopes and to image specific areas without needing to align the distal end of the endoscope.

Biography
Wei-Chih Wang is currently a Research Associate Professor in the Department of Mechanical Engineering and an Adjunct Research Associate Professor in the Department of Electrical Engineering at the University of Washington. He graduated from University of Washington with a degree in electrical engineering in 1996. He later received a postdoctoral fellowship for a DARPA funded piezoelectric MEMS project under Dr. Eun Sok Kim at the University of Hawaii (now at USC) between 1996 and 1997. He has authored or co-authored over 100 technical publications, held 8 patents and over 165

disclosures. His research interests are in the area of developing polymer based micro sensors and actuators for industrial and biomedical applications. More recently, his work has been expanded to Thz, IR and visible band 3-D metamaterial, and electromagnetic and eletrocactive polymer material study. He is currently a member of SPIE and IEEE. He is also a member of the editorial board for the International Journal of Optomechatronics and the Sensors & Transducers Journal and serve in the program committees for SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring and International Symposium on Optomechatronic Technologie since 2003 and 2009.

****** ALL ARE WELCOME ******

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