BEN-GURION UNIVERSITY OF THE NEGEV
P.O.Box 653, BEER-SHEVA 84105, ISRAEL

אוניברסיטת בן-גוריון בנגב
ת.ד. 653, באר שבע 84105

Department of Biomedical Engineering
Faculty of Engineering Science
Tel. 972-8-6479614 Fax. 972-8-6479628

המחלקה להנדסה ביורפואית
הפקולטה למדעי ההנדסה

סמינר מחלקתי מיוחד – הנדסה ביורפואית
יום שלישי בשעה 16:30 25.12.2012 בנין 51 חדר 117
BME Seminar, Tuesday 16:30, Building 51, room 117

Optics in biomedical applications

Zeev Zalevsky, PhD
Faculty of engineering, Bar-Ilan University

In this presentation I will focus on three types of technologies in which optics is used for biomedical applications.

In the first technology I will speak about remote sensing device based upon temporal and spatial tracking of secondary speckle patterns in order to have nano metric accurate estimation of the movement of back reflecting surfaces as the skin or the sclera. This technology was applied for remote and continuous estimation of heart beats, blood pulse pressure, intra ocular pressure, estimation of alcohol and glucose concentrations in blood stream as well as for early detection of malaria.

In the second technology I will present a new type of recently developed flexible endoscope being as thin as the human hair and which is capable of backwards transmission of images with resolution of tens of thousands of pixels. Due to it being so thin, it may go into the body while being minimally invasive. I will show the usage of this endoscope for high resolution imaging from inside of various tissues.

In the third part of the presentation I will show how extended depth of focus technology can be added on top of contact lenses to solve presbyopia and regular/irregular astigmatism and on top of intra ocular lenses to allow continuously focus extended vision starting from near range of about 30cm and up to far range.

About the Lecturer

Prof. Zeev Zalevsky obtained a BSc in Electrical engineering from Tel-Aviv University in 1993. He went on to obtain a PhD in Optoelectronics from the same university in 1996, his Doctoral thesis was in the field of Super-resolution. He accepted a position at Bar Ilan University in 200 where he is the head of the Opto-electronics division in the Electrical engineering faculty since then. In 2007, Prof. Zeev was one of the leading founders of the Bar-Ilan Institute of Nanotechnology & Advanced Materials (BINA). Prof. Zalevsky is best known for his work on Super Resolution. He published more than 400 papers and 5 books and has received several honors, including the International Commission for Optics (ICO) Prize (2008), the Fund Juludan Research Prize (2009) and the Israeli Young Investigator Award in Nanoscience and Nanotechnology for the year of 2012. Prof. Zalevsky established several optical companies. In 1998 he established the Civcom Ltd. which is a pioneer in the development and manufacturing of cost-saving Opto-electronic components and modules. The company was sold to the Brazilian Padtec corporate in 2008 for $80M.