

# **YEDITEPE UNIVERSITY**

## **Department of Biomedical Engineering**

### **SEMINAR**

**January 2, 2012 (Monday)**

**15:00**

**Engineering Building B-312**

### **Clinical Gait Analysis: Relevance to Diabetic Patients**

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Gait analysis is a common clinical tool employed to diagnose disorders that affect the human gait, to plan conventional or surgical interventions and assess the efficacy of these interventions. Gait analysis consists of the measurement of kinetic, kinematic and electromyographic characteristics of human locomotion. Human gait may be impaired by various disorders; arthritis (osteo and rheumatoid), traumatic lower extremity amputations, cerebral palsy, diabetes etc. Among these, diabetes related gait complications is very common. Every year in the USA as many as 100,000 amputations are performed in diabetic patients, due to infected skin breakdowns on or underneath the foot. Wounds that occur as a result of biomechanical loading in the foot are called "ulcers". Even though it is known that mechanical forces play a major role in the pathology of these lesions, the exact etiology of the problem remains to be resolved. Investigators have held the vertical (normal) component of the ground reaction forces responsible for the formation of diabetic ulcers, however recent studies have revealed the significance of horizontal shear forces. Shear forces are thought to contribute to skin breakdown by acting with twice the frequency of the normal forces underneath the foot. Also of concern is the kinetic friction

related heat generation within the shoe, which may increase the temperature of the tissue. Diabetic patients are known to be prone to microvascular problems that limit blood circulation within the foot. An increase in the temperature of the tissue, thus in the metabolic rate, might lead to tissue necrosis in the feet of such patients. Unfortunately, the current generation of therapeutic footwear designed for diabetic patients do not address most of these parameters, which results in ulcer recurrence in many of the patients who wear such footwear. In order to minimize the incidence of diabetic ulcers, a new generation of footwear needs to be developed, which would take all of the significant pathologic factors into account.

### **Metin Yavuz / Biography**

Metin Yavuz, lisans ve yüksek lisans derecelerini 1998 ve 2001 senelerinde İstanbul Teknik Üniversitesi Gıda Mühendisliği'nden almıştır. Daha sonra, doktora çalışmalarını Cleveland State University'de Applied Biomedical Engineering bölümünde 2007 senesinde tamamlamıştır. Doktora sonrasında, araştırmacı olarak Ohio College of Podiatric Medicine'da çalışmaya başlamıştır ve 2008 senesinden beri aynı kurumda Research Assistant Professor olarak çalışmalarına devam etmektedir.