

Bioengineering Seminar

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Functional Near Infrared Spectroscopy: Basic Principles and Applications to Aerospace, Medicine, and Clinical Life-saving Solutions

Functional near infrared spectroscopy (fNIRS) is an emerging brain monitoring technology that relies on optical techniques to detect changes in cortical hemodynamic responses to sensory, motor, or cognitive activation. It was originally developed for clinical monitoring of tissue oxygenation but evolved into a useful tool for neuroimaging studies, and better understanding of human brain function. The fNIRS technology is a portable, safe, affordable and negligibly intrusive system that uses specific wavelengths of light, irradiated through the scalp, to enable noninvasive measurement of localized concentration changes of deoxygenated hemoglobin (deoxy-Hb) and oxygenated hemoglobin (oxy-Hb). Consistent with the neuroergonomic approach, fNIRS sensor can allow capturing brain at work in naturalistic environments during everyday tasks. This presentation will introduce fNIRS technology principles, latest system designs, and signal processing approaches. The second part of the presentation will review our recent fNIRS applications ranging from human computer interaction to medical devices, including cognitive workload assessment of operators, synthetic speech perception (sound quality and neural correlates), and brain computer interfaces for control and communication.

Thursday, March 6, 2014

12:00PM-1:00PM, Room 4801

Nguyen Engineering Building

BIOGRAPHY

Hasan Ayaz, Ph.D. is an Assistant Research Professor in Biomedical Engineering. He received his BSc. in Electrical and Electronics Engineering at Bogazici University with high honors and MSc and PhD degrees in Biomedical Engineering and studied Functional Near Infrared (fNIR) Spectroscopy. Research interests include brain computer interfacing and human performance assessment using optical brain sensors. He is experienced in software development, computer graphics, user interface design, and embedded system development.



For any questions please contact Claudia Borke at cborke@gnu.edu, (703) 993-4190