Biomedical Engineering Creativity Lab (BME W(CL)^2)

Project Title: *Intraoperative Guidance System for Brain Tumor and Epilepsy Surgery*

Description Develop an optical apparatus that performs intraoperative tissue differentiation and hence guides surgery. Tissue differentiation is achieved through two modalities: optical spectroscopy and quantitative ultrasound imaging.

Scientific and Engineering Disciplines Involved
Biomedical Optics, Instrumentation, Signal Processing, Image Processing, Neurological Surgery

Project Title: *Wireless Wearable Sensors for the Real-Time Acquisition of Physiological Signals and Analysis of Movements*

Description Develop multimodal wearable sensors that wirelessly monitor the physiological conditions and movements of the users in a continuous fashion for the assessment of, for example, balance and energy expenditure.

Scientific and Engineering Disciplines Involved
Sensors, Wireless Communication, Physiology, Biomechanics, Biosignal Processing

Project Title: *Implantable CO_2 Sensor*

Description Develop implantable CO_2 sensors to monitor regional CO_2 production *in vivo*.

Scientific and Engineering Disciplines Involved
Sensors, Respiratory Physiology, Biosignal Processing, Biomedical Optics, Biomaterials

Project Title: Functional Brain Imaging using Functional Near-Infrared Spectroscopy (fNIRS)

Description Using fNIRS to study brain activities in response to various activities such as language learning and performing mental tasks.

Scientific and Engineering Disciplines Involved
Biomedical Optics, Instrumentation, Signal Processing, Brain Science