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Biomedical Engineering
Wallace H. Coulter Foundation
Seminar Series

"NONINVASIVE MONITORING OF THE PATHOPHYSIOLOGY OF SKIN"

Dr. Jessica Ramella-Roman
The Catholic University of America, Washington DC.

Thursday, February 23rd, 2012
LECTURE: 9:00 AM - 10:00 AM

ENGINEERING CENTER
ROOM EC 2300
10555 WEST FLAGLER STREET
MIAMI, FL 33174

Abstract:

A quantitative assessment of skin pathophysiology is of great interest to the medical community and can be used to develop minimally invasive technologies for the diagnosis and treatment of disease. In the last few years the Biomedical Optics Laboratory at The Catholic University of America has developed both imaging and sensing techniques aimed at quantifying skin behavior and health in different clinical scenarios.

Fiber optics sensors were developed to monitoring skin hemodynamics during Autonomic Dysreflexia (AD) an inappropriate response of the sympathetic nervous system that often occurs in individuals with spinal cord injury (SCI). Both animal and human studies were conducted showing that AD may cause severe ischemia and hypoxia in the skin of SCI individuals possibly leading to skin damage.

Imaging Spectroscopy (IS) and Spatial Frequency Domain Imaging (SFDI), were used to monitor skin molecular content post injury (thermal injury, electrical injury, and pressure injury). Quantitative values of blood volume, skin oxygen saturation, and water concentration were measured with these imagers, both in animal models and human clinical trials, and were ultimately used to establish the severity of injury and skin healing progress.

In this talk we will discuss our approach in designing and constructing the instrumentation as well as the results of the animal and clinical trials.

Biography

Jessica C. Ramella-Roman received an Electrical Engineering degree (Laurea) from the University of Pavia, Italy in 1993 and a Master and Ph.D. degree in Electrical Engineering from Oregon Health Science University in Portland, Oregon in 2004.She was a Post Doctoral Fellow at the Applied Physics Laboratory of the Johns Hopkins University from 2004 to 2005. She is currently an Associate Professor of Biomedical Engineering at The Catholic University of America and Adjunct Assistant Professor in the Johns Hopkins School of Medicine. Her current research interests include the use of spectroscopic methodologies for measurements of skin and retinal oxygenation, the design of fiber -optic probes for biomedical applications, as well as investigating polarized light transport into scattering media.

Contact: bmeinfo@fiu.edu; 305-348-6717
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