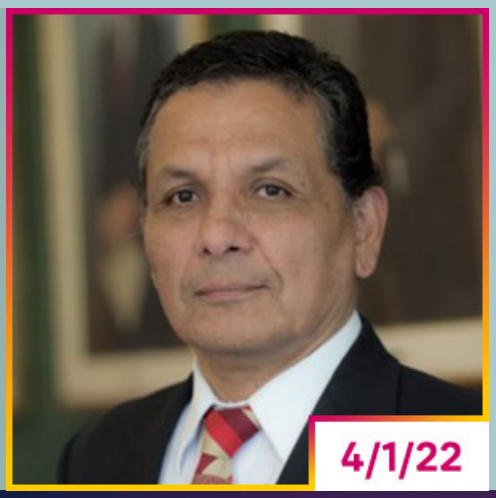
FIU Engineering & Computing
Biomedical Engineering

Wallace H. Coulter Foundation
Biomedical Engineering Seminar Series

DR. FIDIAS E. LEON-SARMIENTO is a Colombian physician (MD), and obtained his PhD in clinical neurophysiology from Kagoshima University, Japan. He did postdoctoral studies at the UAB, Birmingham, AL in neuromuscular disorders, and at the NIH in movement disorders and non-invasive neural stimulation, among other training. Dr. Leon-Sarmiento is an Associate Professor (courtesy) in the Department of Electrical and Computing Engineering at the FIU. He is also the Chief of the multimodal intraoperative neurological monitoring unit at Baptist Hospital (Miami, FL). Much of his current research focuses on corticospinal physiology function and restoration, particularly brainstem and spinal cord reflexes. He also has studied sensory system, and has lead research 's efforts to determine the role of the brainstem in heathy aging and in Alzheimer's and Parkinson's. He discovered that the sense of smell is deeply affected in myasthenia gravis, and unaffected in functional movement disorders, among others. Likewise, he recently discovered a superfast vagus nerve sensory pathway. He also has incorporated new tools to improve neurorehabilitation and neurorestoration in patients affected by sensorimotor disorders.



DR. FIDIAS E. LEON-SARMIENTO

Associate Professor (Courtesy)
Florida International University

FRIDAY, APRIL 1, 2022 | 9:00 AM | EC 3930 | ONLINE

THE EFFECTS OF CRANIOFACIAL MUSCLE CONTRACTIONS ON THE (FORMERLY) VAGAL NERVE SOMATOSENSORY EVOKED POTENTIALS

ABSTRACT: Objective: Historical studies reported that electrical stimulation applied over vagus nerve (VN) afferents from the tragus of the human ear induced skull responses labeled as the vagus nerve somatosensory evoked potential (VSEP). Miscellaneous results acquired from healthy and diseased populations suggested that the origin of the VSEP might not correspond to brain neural activity, but rather to unwanted electromyographic oscillations. Our objective was to definitively demonstrate that scalp recordings labeled as the (formerly) VSEP (fVSEP) are the expression of muscle activity surrounding recording electrodes.

Methods: Using surface electrodes, we electrically stimulated the right ear tragus of five healthy male individuals (mean age: 44 ± 12 years) at 2, 4, 6, 8, and 10 mA. We recorded the VSEP from the skull of participants while they were relaxed and during controlled voluntary craniofacial muscle movements.

Results: Increasing the stimulus intensity significantly paralleled the increase of the motoneuronal recruitment of the fVSEP during relaxed conditions (eyes open: $p = 0.04$; eyes closed: $p = 0.03$). Likewise, voluntary craniofacial muscle contractions significantly modified the duration ($p < 0,01$) and amplitude ($p = 0013$) of the fVSEP.

Conclusions: Our results indicate that the fVSEP is the graphical expression of depolarization and repolarization overflow of signals happening at a distance from the source as well as the electromyographic expression of unwanted muscle oscillations exerted by craniofacial muscle events registered beyond the point of recording. Therefore, the fVSEP should no longer be considered a brain somatosensory evoked potential nor a measure of autonomic function.

Through the generous support of the Wallace H. Coulter Foundation, the Department of Biomedical Engineering facilitates weekly lectures each year during academic terms. Experts in all areas of Biomedical Engineering are invited to provide a research seminar and to meet with faculty and students to discuss the latest developments and research in Biomedical Engineering.

Friday, April 1, 2022 | 9:00 AM
https://bme.fiu.edu/seminars