TEXAS A&M UNIVERSITY
Department of Electrical and Computer Engineering
College Station, Texas 77843-3128
TEL (979) 845-9583 FAX (979) 845-7161
ella@ece.tamu.edu
http://amsc.tamu.edu

S E M I N A R

Room 119A, ZEC

February 19, 2013 3:55-5:10 P.M.

An Ultra Low-Power/Low-Noise Biopotential Amplifier for ECG Applications

by

Jesus Efrain Gaxiola-Sosa
Texas A&M University, AMSC

Abstract: The electrocardiogram (ECG) is a graphical representation of the biopotential signals generated by the human heart. The ionic current in the body is translated into electron current through an electrode-electrolyte interface (electrode) resulting in a low-amplitude signal very sensitive to noise and common mode signals. Therefore, a biopotential amplifier with low noise and high common mode rejection ratio (CMRR) is required. Moreover, the amplifier should have low power consumption to allow its inclusion in ambulatory systems. This presentation discusses the main issues on the design of biopotential amplifiers and proposes a fully integrated ultra low-power/low-noise differential AC coupled chopped amplifier with input impedance boosting, and low high-pass cut-off frequency. The circuit has been fabricated in the 0.5 um CMOS ON-SEMI process and is under test. Post layout simulations show a 3.5µW power consumption, 480nVrms input referred noise, 27nV/√Hz thermal noise level and CMRR>83dB.

Jesus Efrain Gaxiola-Sosa was born in Merida, Yucatan, Mexico in 1985. He received the B.S. degree in electrical engineering with high honors from the Merida Institute of Technology, Mexico in 2008. He is currently pursuing the Ph.D. degree in electrical engineering at Texas A&M University, College Station, TX. He participated as system engineer intern with Texas Instruments (Power Management Group) in 2010 and as IC design inter with Biotronik in 2012, working on DC/DC converters design and medical implantable circuit design respectively. His research interests include ultra-low power analog front-ends for biopotential signals and implantable medical devices.