



## SEMINAIRE

de 14 h à 15 h, salle Belledonne, IMEP-LaHC, Bât. BCAi, Minatec,  
ouvert à tous : enseignants, étudiants, chercheurs, administratifs, techniciens)

Lundi 01 avril 2019

“An alternative approach for bioimpedance measurements  
and data analysis”

by Giovanni RAMIREZ-CHAVARRIA

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**Abstract:** This talk discusses an alternative framework for electrical impedance measurement and parametric estimation as a powerful tool to characterize biological media. The experimental setup for data acquisition uses high-throughput electronics and a fast-time and wideband signal as the input. The data analysis problem is formulated in a model-based approach, it transforms the frequency-domain estimation problem into a time constant domain estimation problem through the distribution of relaxation times (DRT) model. For the existence of a numerical solution, the DRT model is posed in a regularized least squares (RLS) form. The proposed methodology is first validated in numerical simulations and afterwards applied for ex-vivo biological tissue characterization and microcolloid concentration sensing. Results show that the proposed method outperforms the state-of-the-art techniques for spectral bioimpedance analysis.

*Giovanni Ramírez received the Master and the Ph.D. degrees in electrical engineering from Universidad Nacional Autónoma de México (UNAM), in 2015 and 2019, respectively. His dissertation was focused on alternative techniques for addressing the Electrical Impedance Spectroscopy technique, from modeling to experiment. He teaches undergraduate and graduate courses as well as supervises final degree projects. His main research interests are in the field of instrumentation and sensors, microdevices, system identification, and signal processing, in a broad range of applications. G.Ramírez is currently in post-doctoral position at UNAM.*

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