Friday June 21, 10h00, room BM 1.130

Dielectrophoresis for selective Bioparticle Manipulation in Sample Preparation and Nanomanufacturing

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Dielectrophoresis (DEP) is a well-known technique for the spatiotemporal manipulation of targeted cells and microorganisms. In this talk I will present selected DEP platforms used for bioparticle study, separation and manipulation in the context of healthcare and nanomanufacturing applications. These platforms include 1) 3D carbon-electrode DEP to increase throughput and efficiency of DEP devices; 2) integration of DEP with centrifugal microfluidics (spinDEP) towards point-of-care devices; 3) the integration of DEP with a robotic system (roboDEP) to implement automated transfer of selected particles akin to liquid handling robots; and 4) the use of light-induced DEP (LIDEP) for cell analysis and nanomanufacturing.

About the speaker

Rodrigo Martinez-Duarte is the Director of the Multiscale Manufacturing Laboratory www.multiscalemanufacturing.net at Clemson University since 2013. His expertise lies at the interface between micro/nanofabrication, carbonaceous materials, electrokinetics and microfluidics. His interdisciplinary laboratory currently focuses on Dielectrophoresis for Healthcare and NanoManufacturing applications and novel processes to architect multifunctional carbonaceous structures, including origami and robocasting. Rodrigo holds advanced degrees from the University of California, Irvine (Madou BioMEMS group) and a BS from Tecnológico de Monterrey, Mexico. He was a Postdoctoral Researcher at the École Polytechnique Fédérale de Lausanne in Switzerland (Renaud-LMIS4 group). He has extensive international experience having coordinated or participated in different interdisciplinary research projects in the US, Switzerland, Spain, India, Mexico and South Korea.

Prof. Martinez-Duarte has a track record of service and leadership. He currently is the President of the AES Electrophoresis Society, an elected member of Clemson University's Commission on Latino Affairs, Chair of the Mechanical Engineering International Committee, Chair of the College of Engineering, Computing and Applied Sciences (CECAS) Committee on Global Engagement, and an active Reviewer for leading journals in his field. He is or has chaired several sessions and international meetings within the Electrochemical Society, Society for Hispanic Professional Engineers and AES. He was the recipient of the Public Impact fellowship at UC Irvine in 2010, and in 2019 both Junior Faculty Eastman Award for Excellence in Mechanical Engineering, and the Esin Gulari Leadership and Service Award in CECAS at Clemson University.