

TcSUH SPECIAL SEMINAR

Dr. Nicolás Pérez Rodríguez

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Monday, March 4, 2019

Room 102, Houston Science Center
10:30 am – 11:30 am

Understanding Thermoelectric Devices at the Micro Scale

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ABSTRACT: Energy harvesting and thermal management are required for applications in the internet-of-things, autarkic sensors, or highly integrated electronic devices. Thermoelectric generators and coolers are promising technologies for localized energy harvesting and thermal management. These devices are currently well optimized for near-room temperature operation at the macroscopic scale. However, the high integration density of today's most significant applications requires an increasing degree of miniaturization. Using finite element calculations, we gained insight on the design guidelines for micro thermoelectric devices with realistic material properties, and with concurring size and geometry constraints [1]. Understanding the interplay between thermal and electrical heat fluxes at the micro scale allowed our group to fabricate micro thermoelectric devices for thermal management that can be integrated in electronic packages [2]. In this specialized talk our relevant findings about the design of micro thermoelectric devices will be presented and discussed.



[1] D. A. Lara Ramos et al. *Adv. Sustainable Syst.* 1800093 (2019)

[2] G. Li et al. *Nature Electronics* 1, 555 (2018).

BRIEF BIO: Born and raised in Spain, Nicolás Pérez Rodríguez obtained his degree in Physics in 1999. After a nine year track in finance and other business areas (MBA in 2002) he returned to Academia, earning his Master Degree in Nanoscience and Nanotechnology (2007), and PhD in Nanoscience (2012), both at the Universitat de Barcelona. Lecturer at the Universitat de Barcelona from 2010 to 2013, currently he lectures on Solid-State Physics and Thermoelectricity at the TU-Dresden. As a researcher at the Leibniz Institute for Solid State and Materials Research in Dresden (IFW-Dresden), his research interests remain centered in fundamentals of nanosized materials, deepening in applied aspects related to energy, biology, and sensing.

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