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ELECTRICAL & COMPUTER ENGINEERING
TEXAS A&M UNIVERSITY

S E M I N A R

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A Fully Integrated Power Combiner for Multiple-Input Simultaneous Energy Harvesting

by

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Abstract: In applications powered by energy harvesting, the reliability of the system can be compromised by the intermittent nature of the selected energy source. However, robust operation can be achieved by simultaneously harvesting from various heterogeneous sources. In this work, the design of a capacitive-based system that combines the energy delivered by multiple inputs is described. The proposed architecture develops a smart harvesting strategy by selecting the sources with the largest output power and performs maximum power point tracking (MPPT). It has been fabricated in a CMOS 130nm process and shows a measured peak tracking efficiency of 96%, maximum output power of 803µW and peak conversion efficiency of 86%, with a static current consumption of 800nA.

Johan J. Estrada-López was born in Mérida, México. He received the B.Sc. degree in electrical engineering from Merida Institute of Technology, Merida, MX in 2001 and the M.Sc. degree in electrical engineering from the Center of Advanced Research and Studies in Guadalajara, MX in 2003. He is currently pursuing the Ph.D. degree at Texas A&M University, College Station, TX, USA.

From 2004 to 2014, he was a Professor at the Universidad Autonoma de Yucatán, from where he is in a leave of absence. From 2012 to 2013 he was a Layout Design Engineer at Vidatronic Inc. Since 2014, he has been with the Analog and Mixed Signal Center, Texas A&M University. In 2017, he was a design intern with the Power Delivery Group of Intel Corp., Hillsboro, OR, USA. His current research interests include energy harvesting circuits, power management, and Internet-of-Things applications.