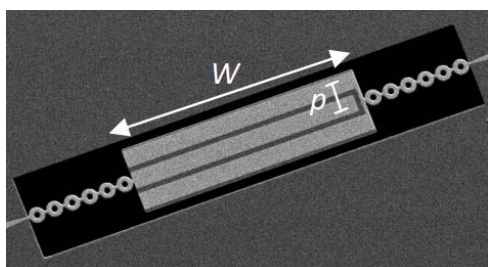


BUENAVENTURA ELECTRON DEVICES / CIRCUITS AND SYSTEMS SOCIETIES CHAPTER

Micro/Nano-Electro-Mechanical Systems (M/NEMS) Resonators: Fundamentals and Applications

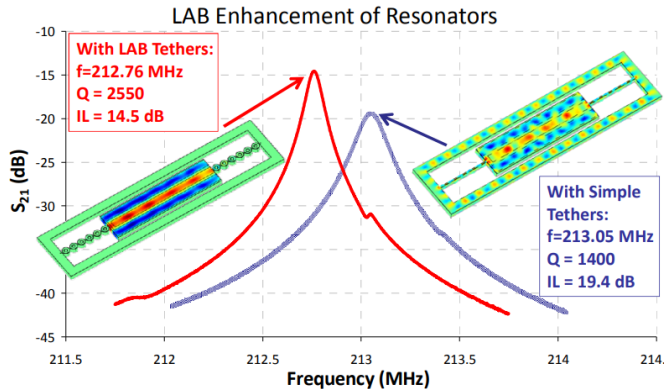
Speaker: *Dr. Logan Sorenson, HRL Laboratories, LLC, Malibu, CA 90265*



March 27, 2018 at 6:30 PM

Location: Skyworks Solutions, Newbury Park, CA

Since the invention of the integrated circuit, the path followed by the semiconductor industry has led to unprecedented advances in technology and computation through miniaturization and integration of highly complex circuits into single chips. More recently, this trend toward extreme miniaturization characterized by Moore's Law has expanded beyond traditional computing devices into the realm of integrating more features and capabilities on a single chip (More-than-Moore/MtM). For example, in some emerging application areas, including the Internet-of-Things (IoT) and Industry 4.0, the barrier between the cyber and the physical worlds is heavily eroded. Sensor systems, which convert physical quantities into their digital counterparts, and especially those which can be integrated on chip in the MtM paradigm, are highly sought after as the gateway between worlds. This talk will review the fundamentals of Micro and Nano-Electro-Mechanical Systems (M/NEMS), in which the traditional microfabrication technologies developed by the semiconductor industry are adopted and adapted to create resonant structures which are free to mechanically vibrate on chip. M/NEMS resonators have been used in a variety of different ways to implement various sensor systems on chip, including temperature and pressure sensors, timing elements, inertial sensors including accelerometers, gyroscopes and magnetometers, and gas and chemical sensors, among other physical quantities of interest. These sensors have already widely proliferated into everyday consumer products, including automobiles, smartphones, activity trackers, and the like. The talk will conclude by highlighting some emerging high performance M/NEMS-based sensors and the associated challenges.



Dr. Logan Sorenson is a Research Staff Member at HRL Laboratories, LLC in Malibu, CA. He received the B.S. and the M.S. degrees in Electrical Engineering from the Illinois Institute of Technology (IIT), Chicago, in 2004 and 2007, respectively. In 2003-2004, he spent one year on exchange in Stockholm, Sweden, at the Royal Institute of Technology (KTH). He received the Ph.D. degree in Electrical and Computer Engineering with a focus in Micro-Electro-Mechanical Systems (MEMS) inertial sensors and timing devices from the Georgia Institute of Technology, Atlanta, in 2013 and subsequently joined HRL Laboratories. His research interests are in the areas of design, modeling, simulation, fabrication, and evaluation of resonant M/NEMS materials and devices, precision oscillators, inertial sensors, gravimetric, chemical and temperature sensors, energy dissipation, noise, phononic crystals, and integration of M/NEMS with semiconductor and atomic devices. Dr. Sorenson was a recipient of a Camras and Grainger scholarship at IIT and the 2005 IEC Everitt Award of Excellence. He also earned the IIT Graduate Outstanding Academic Achievement Award, and, in 2007, the prestigious Georgia Tech Institute Fellowship. He is the recipient of the inaugural Outstanding Oral Paper Award at the 2013 IEEE MEMS conference in Taipei, Taiwan, and served on the Technical Program Committee of the IEEE MEMS conference as well as a reviewer for the IEEE Inertial Systems conference and the IEEE Journal of Microelectromechanical Systems. He was selected as a 2015 DARPA Riser for promising early-career researchers. Dr. Sorenson has authored or co-authored over 20 publications and holds 6 patents with 30 patents pending.



Location

Skyworks Solutions

649 Lawrence Drive, Newbury Park, CA 91320

Intersection of West Hillcrest Drive and Lawrence Drive

(**NOT** the main building, please use link below to arrow that pinpoints building)

<http://maps.google.com/maps?q=34.187542,-118.930994&num=1&t=h&vpsrc=0&ie=UTF8&z=18&iwloc=A>

Directions

From Los Angeles

Highway 101 North

Take exit 47A for Rancho Conejo Blvd

Use the left lane to turn right onto Rancho Conejo Blvd

Turn left onto W Hillcrest Dr.

Destination will be on the right

From Ventura

Highway 101 South

Take exit 47B for Wendy Dr. toward Newbury Park

Turn right onto N Wendy Drive

Continue onto Camino Dos Rios

Turn right onto W Hillcrest Drive

Destination will be on the left.

