

Center for Wireless Integrated MicroSensing & Systems

presents

WIMS² SEMINAR

Friday, December 13, 2019 2:30 – 3:30 pm 1005 EECS Bldg.



Vibrating Beam MEMS Accelerometers for Gravity and Seismic Measurements

ASHWIN A. SESHIA

Professor of Microsystems Technology
Department of Engineering, University of Cambridge

Abstract: Advances in microelectromechanical systems (MEMS) have enabled the widespread development of inertial sensors for a variety of consumer, automotive, and wearable healthcare applications. Despite the significant advances, there continues to be interest in the development of highly accurate MEMS inertial sensors for a variety of emerging applications, for e.g., navigation systems for pedestrians and autonomous vehicles, and seismic and gravity imaging, where the traditional attributes of MEMS (miniaturization and system integration) are combined with scalable transduction principles to enable highly accurate physical measurements. Resonant transducers and oscillatory systems have historically been employed to conduct some of the most precise physical measurements, and resonant approaches to measurement of forces and displacements in MEMS devices have enabled significant advances in the accuracy of MEMS inertial sensors in recent years. This talk will describe the evolution of vibrating beam MEMS accelerometers demonstrating exceptional long-term stability for applications in gravimetry and seismology. Device sensitivity and stability are demonstrated through the tracking of Earth tides and recording of ground motion corresponding to a number of seismic events.

Biography: Ashwin Seshia received the B.Tech. degree in Engineering Physics from IIT Bombay in 1996, the M.S. and Ph.D. degrees in Electrical Engineering and Computer Sciences from the University of California at Berkeley, Berkeley, in 1999 and 2002, respectively, and the M.A. degree from the University of Cambridge in 2008. He joined the Faculty of the Engineering Department at the University of Cambridge in 2002, where he is currently the Professor of Microsystems Technology and a Fellow of Queens' College.

He heads the MEMS research group at the Cambridge University Nanoscience Centre, and is also a co-investigator of the Cambridge Centre for Smart Infrastructure and Construction. He has published over 200 peer-reviewed research papers in the area of MEMS and is a co-inventor on over 20 granted patents / patent applications, particularly in areas relating to linear and non-linear resonant microsystems, and applications to sensors and sensor systems. He is a co-founder, CSO and non-executive director of Silicon Microgravity Ltd., a Cambridge University spin-out developing MEMS gravimeter technology for sub-surface monitoring of fluids based on research in the field of resonant MEMS inertial sensors. He is also a co-founder of 8power Ltd., a University spin-out currently developing self-powered wireless sensors for civil structural health and industrial monitoring. Both companies were formed to translate technologies developed in Ashwin's research group.

Ashwin is a Fellow of the Institute of Physics (IoP) and the Institution of Engineering and Technology (IET). He serves as Editor for the IEEE Journal of Microelectromechanical systems (JMEMS) and Associate Editor for the IEEE Transactions on Ultrasonics, Ferroelectrics and Frequency Control. He has previously served on the editorial boards for the IoP Journal of Micromechanics and Microengineering and the IEEE Transactions on Nanotechnology. Ashwin has also served on several conference program committees including the IEEE Frequency Control Symposium and the European Frequency and Time Forum, as well as the IEEE MEMS Conference and IEEE International Electron Devices Meeting. He is an elected member of the Executive Committee of the European Frequency and Time Forum. In 2018, he received the IEEE Sensors Technical Achievement Award (Advanced Career - Sensor Systems) "for pioneering contributions to resonant microsystems with application to sub-surface density contrast imaging and energy harvesting systems".

For information contact: Trasa Burkhardt ■ Center for Wireless Integrated MicroSensing & Systems (WIMS²) ■ <http://wims2.org>

2300A EECS Bldg., 1301 Beal Ave. ■ Ann Arbor, MI 48109-2122 ■ Phone: 734-763-2126 ■ Fax: 734-647-2342 ■ trasab@umich.edu