DL talk Title: Silicon MEMS Pressure Sensors

Date: 10th February 2021
Time: 3:30pm Sydney time

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Pressure sensors are the earliest commercially successful MEMS sensors and bring out many aspects of the success of MEMS technology. Starting with the standard pressure sensors with bulk micromachined silicon membranes and polycrystalline silicon piezoresistors, we introduce modifications in materials as well as the design to improve the sensitivity and range. Low pressure sensors made from silicon, based on Knudsen's forces, will also be discussed. Knudsen's forces are gas molecular forces originating due to differential temperatures in rarefied gases and can be used to measure absolute pressure using microfabricated structures. The fabricated gauge had a sensitivity of 100 fF/Pa and a resolution of 10% in the pressure range 0.1 to 10 Pa. Modifications are underway to expand the range and improve the sensitivity.

Biography

Name : Enakshi Bhattacharya, PhD
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Enakshi Bhattacharya completed her MSc (Physics) from the Indian Institute of Technology Bombay in 1980; PhD from the Tata Institute of Fundamental Research, Mumbai in 1985 and did post-doctoral work on amorphous silicon solar cells at the National Renewable Energy Laboratory (then the Solar Energy Research Institute), USA from 1986-88. She was a faculty member in the Department of Physics, IIT Kanpur during 1988-91. Since 1991, she has been on the faculty of the Department of Electrical Engineering at IIT Madras and chaired the department during 2010-2013. She spent a sabbatical year in 2000 at the Micromachined Products Division, Analog Devices, USA and a semester at IIT Mandi in 2017. She has played a key role in establishing the Centre for NEMS and Nanophotonics at IIT Madras in 2011 which is now a part of the national Nanoelectronics Network for Research and Applications. Her expertise is in silicon processing and its interdisciplinary applications and her current research areas are in MEMS/NEMS, BioMEMS and Biosensors. She is the recipient of the Institute of Smart Structures and Systems (ISSS), India Distinguished Service Award, 2019 and the IEEE Sensors Council Distinguished Lecturer award, 2021-2023.