

IEN Technical Seminar on Advanced Fabrication: Silicon Piezoresistive Transducer Design - A Practical Guide



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Thursday, September 29th, 2016 | 12:00pm - 1:00pm
Marcus Nanotech | Room 1116-1118

Abstract: The goal of the seminar is to provide a practical guide for the design of silicon-based piezoresistive transducers. The first part introduces the theoretical background to understand piezoresistivity in silicon with the focus of providing enough engineering knowhow to be able to design basic piezoresistive transducers without presenting an in-depth theoretical treatment. Silicon-based piezoresistors either comprise doped region in the crystalline silicon substrate or doped polysilicon resistors. Ways to fabricate such doped resistive structures are highlighted, with a particular emphasis on processes available within the cleanrooms of Georgia Tech's Institute for Electronics and Nanotechnology. The final part of the seminar will discuss a number of piezoresistive transducers designs that Georgia Tech's Integrated Sensing Systems (iSenSys) Lab has used to sense the vibration of silicon-based microresonators vibrating either in out-of-plane or in-plane vibration modes. These examples and a number of basic design guidelines can be used to design piezoresistive transducer elements for other applications.

Biography: Prof. Oliver Brand is a Professor in the School of Electrical and Computer Engineering and the Executive Director of the Institute for Electronics and Nanotechnology at the Georgia Institute of Technology. He received his diploma degree in Physics from Technical University Karlsruhe, Germany in 1990 and his Ph.D. degree from ETH Zurich, Switzerland in 1994. From 1995 to 1997, he worked as a postdoctoral fellow at the Georgia Institute of Technology. From 1997 to 2002, he was a lecturer at ETH Zurich in Zurich, Switzerland and deputy director of the Physical Electronics Laboratory (PEL). He joined the faculty at Georgia Tech in 2003. Dr. Brand has co-authored more than 200 publications in scientific journals and conference proceedings. His research interests are in the areas of integrated microsystems, microsensors, MEMS fabrication technologies, and microsystem packaging. He and his research group have extensively used silicon-based piezoresistive transducers in various sensing applications for the past 25 years.

