

Subject: MSD Colloquium, Thurs, 10/19, 11am, 212, room A157
From: Janice Coble <coble@msd.anl.gov>
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NOTE: Title change and abstract added

SPEAKER: PROF. GIANLUCA PIAZZA
University of Pennsylvania

TITLE: "Piezoelectric Resonant MEMS/NEMS"

DATE: Thursday, October 19, 2006

TIME: 11:00 a.m.

PLACE: Building 212, Room A157

HOST: Orlando Auciello

Refreshments will be available at 10:45 a.m.

ABSTRACT — In the coming decade, the growth of RF communications will be driven mainly by the development of low power and distributed wireless networks. Single-chip, micro radio solutions capable of integrating multimode, multiband and multistandard devices that consume low power and have small form factors will realize the vision of next-generation and ubiquitous wireless communications.

In this talk, I will present a novel and disruptive MEMS resonator technology capable of replacing existing power-hungry transceivers with an all-mechanical MEMS analog front-end. This RF microsystem promises to open a revolutionary pathway for singlechip multiband, reconfigurable, ultra-small and integrated solutions characterized by higher performance in terms of selectivity and noise rejection, as well as longer battery life. This new class of AlN piezoelectric micromechanical resonators has demonstrated high quality factors in air ($Q \sim 3,000$), low motional resistance (50-200 Ω) and can span frequencies from few MHz up to the GHz range on a single chip. What will the future bring? More revolutionary gains are to be had by integrating the sensor functions directly into the analog portion of the radio. Possible use of resonant MEMS for sensing will be presented. Furthermore, attention will be placed on expanding this technology to the nanoscale, emphasizing on possible applications of AlN nanotransducers for wireless sensing platforms.