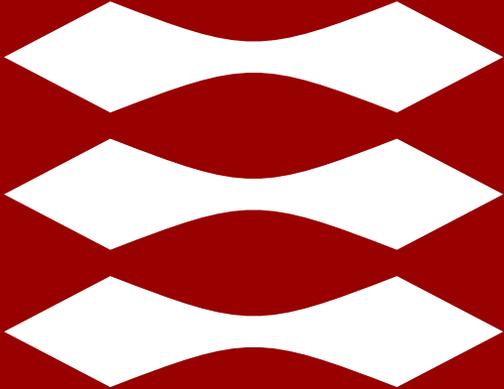


DTU



DTU Elektro Inaugural Lecture – Frieder Lucklum

From MEMS, Ultrasonic Sensors, and 3D-Printing to Phononics and Mechanical-Acoustic Microsystems

Abstract

Microacoustic devices and systems such as hearing aids, miniature headsets, or ultrasonic sensors and actuators, are at the crossroads between multiple engineering disciplines and benefit our society in different ways today. Technological advancements in acoustic systems require expertise from electrical engineering, mechanical engineering, physics, and other fields. Understanding the propagation and interaction of vibrations and waves in confined spaces, different solid and fluid materials, and over widely different frequencies utilizes rigorous analytical, numerical, and experimental methods. Advances in fabrication techniques such as micromachining and MEMS technology or additive manufacturing open new freedom in design and integration. Novel design concepts include the unique physical behaviour found in acoustic metamaterials and phononic crystals to control wave propagation in ways not possible with classical materials.

This inaugural lecture will illustrate research results from MEMS, ultrasonic sensors, and 3D-printing and the application in phononic devices and mechanical-acoustic microsystems. The lecture will lay out a vision to build a sustainable foundation for joining and advancing the engineering expertise in microacoustics, numerical modelling and optimization, and materials and process technology.