

THE DEPARTMENT OF ELECTRICAL & COMPUTER ENGINEERING SPEAKER SERIES

PRESENTS

MEMS Scanning Mirrors and Their Sensing and Imaging Applications



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LECTURE ABSTRACT

Scanning micromirrors are MEMS devices that can steer, modulate and switch light. In addition to being widely used in portable projectors, scanning micromirrors can be applied in numerous sensing applications such as laser beam steering, 3D mapping, micro-lidar, micro-spectrometers, compressive sensing cameras, and endomicroscopy. In all these applications, scanning micromirrors are the enabling device for miniaturization and integration. In this talk, the principles of electrostatic, electromagnetic, electrothermal and piezoelectric actuation mechanisms will be first introduced. Then the designs and fabrication technologies of various MEMS mirrors based on these actuation mechanisms will be presented. After that, four application areas will be discussed, including micro-lidar, micro-spectrometers, compressive sensing cameras, and endomicroscopy. For each application area, theoretical background and the state of the art will be briefly reviewed, followed by a more compressive introduction of one or two specific examples. Finally, the remaining challenges, development trends and more potential applications of scanning micromirrors will be discussed.

SPEAKER BIOSKETCH

Dr. Huikai Xie is a Professor at the Department of Electrical and Computer Engineering of the University of Florida. He received his BS, MS and Ph.D. degrees all in electrical engineering from Beijing Institute of Technology, Tufts University and Carnegie Mellon University, respectively. Before he joined the University of Florida as an assistant professor in 2002, he worked at Tsinghua University (1992-1996), Bosch Corporation (2001), and Akustica Inc. (2002). He has published over 280 technical papers and holds 30 US patents. His current research interests include MEMS/NEMS, integrated inertial sensors, microactuators, optical MEMS, biophotonics, IR spectroscopy, and micro-LiDAR. He has founded two startup companies - WiOptix Inc. in Florida and WiO Technologies in Wuxi, China, and also co-founded another startup company - Senodia Technologies in Shanghai. He has served on the technical program committees of several international conferences and the editorial boards of several international journals.

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