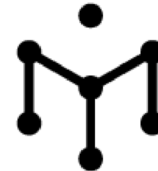
MSEC Seminar and Commercialization Forum



Invited Speaker:

Yoichi Miyahara

"Application of Atomic Force Microscopy Technique for Mechanically Detected Spectroscopic Measurements"

October 11th, 2019
1:30 – 3:00 PM
RFM 3224

Biography:

Dr. Yoichi Miyahara joined the department of physics, Texas State University in January 2019 as an assistant professor. He is an experimental physicist with electrical and mechanical engineering background. He obtained his Ph.D. in electrical engineering at Waseda University in Tokyo, where he worked on the synthesis and tunneling spectroscopy/scanning tunneling microscopy of various transition metal dichalcogenides. He then worked in the department of microengineering at École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland as a research staff where he developed atomic force microscopes which was specifically designed for nanometer scale metrological dimensional measurements. During that period, he was exposed to various aspects of mechatronics instrumentation ranging from optical interferometry to active magnetic control. After he joined the department of physics at McGill University in Montreal as a research associate, he started to work on the development and applications of advanced scanning probe microscopy techniques that are geared toward material property characterization in nanometer scale such as quantum dots, nanoparticles, nanowires and novel energy materials. His research group is currently working on developing new spectroscopic material characterization techniques with nanometer scale spatial

For more information or if you would like to have lunch with the speaker, please contact Dr. Shannon Weigum at sweigum@txstate.edu

resolution based on mechanical detection of relevant signals such as mechanically detected vibrational spectroscopy and electrometry with ultra-high sensitivity.

Abstract:

Since its invention in the 1980s, scanning probe microscopy (SPM) has become an indispensable tool for imaging various surfaces with atomic scale resolution. Particularly, one of the SPM variants, atomic force microscopy (AFM) is now regarded as one of the essential tools widely used in nanoscience/nanotechnology field. In addition to the remarkable imaging capability, it is now recognized that the exquisite sensitivity of the force detection enabled by AFM technique can be used as a detector for various spectroscopic measurements such as nuclear magnetic resonance and infrared spectroscopy. Dr. Miyahara will first give a historical overview of AFM techniques, then give several examples of the AFM based spectroscopic measurements such as single-electron tunneling spectroscopy on individual quantum dots and molecules, and force-detected ultrafast optical spectroscopy. Dr. Miyahra will also discuss the prospect of the spectroscopic measurements enabled by AFM technique.

FOR MORE INFORMATION OR IF YOU WOULD LIKE TO HAVE LUNCH WITH THE SPEAKER,
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