GUEST SEMINAR

HARNESSING METAMATERIALS TO MANIPULATE ELECTROMAGNETIC AND ACOUSTIC WAVES

ABSTRACT:
Metamaterials have been intensively studied and applied to a broad range of practical applications ranging from wireless communications to magnetic resonance imaging. Photonic metamaterials consisting of subwavelength "meta-atoms" have received enormous interest due to their extraordinary and unprecedented optical properties. Specifically, the effective permittivity and permeability can be tailored and reconfigured to construct metamaterial devices by modulating or actuating the constituent meta-atoms. By leveraging microelectromechanical system (MEMS) technology, we have developed functional metamaterial devices to manipulate and detect the terahertz waves. In addition, metamaterials exhibit extraordinary near-field properties to control electric and magnetic field distribution. I will introduce our progress on intelligent magnetic metamaterials to enhance the signal to noise ratio of magnetic resonance imaging. Besides electromagnetic metamaterials, acoustic metamaterials for sound wave shaping and silencing will also be discussed.

BIO:
Xin Zhang received her PhD in Mechanical Engineering from the Hong Kong University of Science and Technology (HKUST). She was a Postdoctoral Researcher and then a Research Scientist with the Massachusetts Institute of Technology (MIT). She then joined Boston University (BU) as a Faculty Member, where she is currently a Professor of Mechanical Engineering, Electrical & Computer Engineering, Biomedical Engineering, Materials Science & Engineering, and the Photonics Center. Dr. Zhang is Associate Director of the Boston University Nanotechnology Innovation Center, and Director of both the NSF Research Experiences for Undergraduates (REU) and Teachers (RET) Sites in Integrated Nanomanufacturing at Boston University. Dr. Zhang’s research interests are in the broad areas of microelectromechanical systems (MEMS or microsystems) and metamaterials (acoustic, electromagnetic, nonlinear, photonic, terahertz, tunable, etc.). She has published 160+ papers in interdisciplinary journals, become both US and EU-US National Academy of Engineering Invitee (ages: 30-45), and is an Elected Fellow of AAAS, AIMBE, APS, ASME, IEEE, NAI, and OSA, and Associate Fellow of AIAA.

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138 ISEC

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