

## **Dynamic Active Metamaterials for Novel Acoustic Applications”**

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**Abstract:** The recent development of acoustic metamaterials has led to engineered media that possess remarkable acoustic responses ranging from almost perfect absorption to negative refraction and cloaking. Most metamaterials reported to date owe their acoustic properties to the geometry of the composing unit cells. Although careful design of the unit cell geometry can generate exotic acoustic responses hard to find in natural materials, this approach has fundamental limitations that makes real applications problematic. In this talk, I will present an alternative approach to metamaterials that is not constrained by geometrical limitations and in which the acoustic response is generated almost entirely by embedded active elements ranging from basic solid state devices to full-fledged microcontrollers and connected to electroacoustic transducers. To illustrate the versatility of this approach I will present fabricated dynamic acoustic metamaterials that can be configured in real-time to have a wide range of acoustic responses, and I will illustrate several potential imaging and sensing applications.



**Bio:** Dr. Bogdan-Ioan Popa is a Research Scientist in the Department of Electrical and Computer Engineering and the Center for Metamaterials and Integrated Plasmonics at Duke University. He received his PhD and MS degrees in Electrical Engineering and Computer Science from Duke University in 2007 and 2004, and the Dipl. Ing. degree from the Polytechnic University of Bucharest in 2002.

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**Time: 12:00pm– 1:00pm**

**Location: 214 Mudd**