

## The Evolution of Biomedical Acoustics: From Colloidal Stimulation to Tissue Ablation

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Biomedical acoustics is beginning to play a more prominent role in the treatment of various medical conditions, including essential tremor, cancer, and neurodegenerative diseases. Ultrasound readily propagates through tissue and can be focused to concentrate acoustic power and increase spatial precision. When combined with pressure- or temperature-sensitive particles and nanocarriers, focused ultrasound can be utilized to ablate solid tumors, transiently disrupt the blood-brain barrier for intracranial delivery of therapeutics, or trigger drug release from nanoparticles. This lecture will review advances in biomedical ultrasound technology and methodology and the various colloids and materials that respond to ultrasound-mediated pressure and temperature changes for therapeutic benefit.



**Tyrone Porter** is an Associate Professor in the Departments of Mechanical Engineering and Biomedical Engineering at Boston University. Additionally, he is the Associate Director for the Center for Nanoscience and Nanobiotechnology. Dr. Porter completed his graduate work in the Department of Bioengineering at the University of Washington in 2003. He was awarded the Frederick V. Hunt Postdoctoral Research Fellowship in Acoustics and the R. Bruce Lindsay Award from the Acoustical Society of America (ASA) in 2003 and 2008, respectively. Dr. Porter was inducted as a Fellow of the ASA in 2017 for his contributions to biomedical ultrasound and image-guided therapy. His research interests exist at the intersection between biomedical ultrasound, chemistry, biophysics, and nanomedicine. He is leading several projects focused on the development of stimuli-responsive colloids for diagnostic ultrasound, localized drug delivery, and focal ablation of solid tumors.