

Imaging and Instrumentation Seminar Series

1:30 – 2:30 pm, Thursday, March 12 2020
EBB, CHOA conference room (1st floor)

Leveraging ultrasound energy conversion for interfacing at the cellular level

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Host: Dr. Stanislav Emelianov (stas@gatech.edu)



Abstract:

Despite the widespread use of ultrasound imaging in biomedical applications, the type of information that can be detected from (or conferred to) the tissue is limited. Typically, the acquired images only include mechanical contrast. Our lab is currently working to leverage a combination of contrast agents and energy conversions to open new conduits of communication with the cells. Three examples of ultrasonic energy conversion will be explored. First, studies exploiting molecularly targeted piezoelectric barium titanate nanoparticles for noninvasive neurostimulation will be presented. Second, our lab's recent work focused on generating light with ultrasound – a phenomenon known as sonoluminescence – for high-resolution fluorescence imaging will be discussed. Finally, an approach for molecular imaging with multiplexed ultrasound-activated phase-change nanoparticles will be described. Taken together, these approaches represent novel way in which ultrasound energy can be converted for biological interfacing.

Bio:

Geoffrey Luke is an Assistant Professor in the Thayer School of Engineering at Dartmouth College where he leads the Functional and Molecular Imaging Laboratory. He earned his BS in computer engineering and mathematics at the University of Wyoming prior to pursuing a MS at the same institution with a focus on biomimetic imaging devices. He completed his PhD at The University of Texas at Austin with a focus on ultrasound-guided molecular photoacoustic imaging. His current research is centered at the confluence of ultrasound, optics, and nanotechnology with applications spanning from noninvasive neurostimulation to clinical photoacoustic imaging.

Website: <http://fmilab.com>

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