UNIVERSITY of HOUSTON | ENGINEERING

Department of Biomedical Engineering

Seminar

Imaging of Multi-Scale Biological Dynamics with Five-Dimensional Optoacoustics

Thursday, December 8, 2016
Dean's Conference Room (Engr Bldg. 2, 4th Floor)
11:30AM-1:00PM

Speaker: Dr. Daniel Razansky

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Abstract: In vivo imaging across multiple scales is commonly associated with challenging compromises between the achievable contrast, imaging speed and spatial resolution. Optoacoustic (or photoacoustic) imaging is increasingly attracting the attention of the biomedical research community due to its excellent spatial and temporal resolution, centimeter scale penetration into living tissues, and versatile endogenous and exogenous optical absorption contrast. State-of-the-art implementations of multi-spectral optoacoustic tomography (MSOT) are based on multi-wavelength excitation of tissues to visualize specific molecules within opaque tissues. As a result, the MSOT technology can noninvasively deliver structural, functional, metabolic, and molecular information from living tissues. Our recent efforts in the field of optoacoustic functional and molecular imaging have established new technological platforms employing spherical matrix arrays, parallel acquisition hardware, GPU-based data processing and fast-tuning laser systems in order to enable acquisition and visualization of spectroscopic information from entire tissue volumes at video rates. This has set the stage for the so-called five dimensional (real-time three-dimensional multi-spectral) optoacoustic imaging that offers unparalleled capabilities among the existing bio-

imaging modalities. Applications are explored in the areas of functional neuro-imaging, fast tracking of agent kinetics and biodistribution, cardiovascular research, monitoring of therapies and drug efficacy as well as targeted molecular imaging studies. Clinical translation roadmap will be finally discussed.

Bio: Daniel Razansky is Professor of Molecular Imaging Engineering at the Technical University of Munich and Helmholtz Center Munich. He earned his degrees in Electrical and Biomedical Engineering from the Technion - Israel Institute of Technology and completed further training in bio-optics at the Harvard Medical School. His Lab is engaged in development of novel techniques for high performance functional and molecular imaging. The focus is on tools that can broadly impact pre-clinical research and clinical practice by delivering information presently not attainable with the existing state-of-the-art imaging modalities. Prof. Razansky has been the inventor of a number of new bio-imaging techniques, which have been successfully commercialized worldwide, among them the multispectral optoacoustic tomography (MSOT), near-field radiofrequency tomography (NRT), and five-dimensional optoacoustic imaging. He has published over 150 peer-review journal articles and holds 12 inventions in bio-imaging and bio-sensing disciplines. He participates on a number of editorial boards of journals published by Nature Publishing Group, Elsevier, IEEE and AAPM. Prof. Razansky was awarded the Biovaria Spin-Off Award, German Innovation Prize, ERC Starting and ERC Consolidator Awards and has also been selected on the “Top 40 under 40" list by the Capital magazine in 2011 and 2012.