

One Step Forward to Clinical and Commercial Photoacoustic Imaging



Please join us for this fascinating talk which will be followed by light refreshments and conversation

Abstract High-resolution volumetric optical imaging modalities, such as confocal microscopy, two-photon microscopy, and optical coherence tomography, have become increasingly important in biomedical imaging fields. However, due to strong light scattering, the penetration depths of these imaging modalities are limited to the optical transport mean free path (~1 mm) in biological tissues. Photoacoustic imaging, an emerging hybrid modality that can provide strong endogenous and exogenous optical absorption contrasts with high ultrasonic spatial resolution, has overcome the fundamental depth limitation while keeping the spatial resolution. The image resolution, as well as the maximum imaging depth, is scalable with ultrasonic frequency within the reach of diffuse photons. In biological tissues the imaging depth can be up to a few centimeters deep.

In this presentation, the following topics of photoacoustic imaging will be discussed; (1) multi-scale photoacoustic imaging systems (i.e., Photoacoustic Nanoscopy, Optical-Resolution Photoacoustic Microscopy, Fast 2-Axis MEMS based Optical-Resolution Photoacoustic Microscopy, Intravascular Photoacoustic/Ultrasound Catheter, Virtual Intraoperative Surgical Photoacoustic Microscopy, Acoustic-Resolution Photoacoustic Microscopy, Clinical Photoacoustic/Ultrasound Scanner), (2) morphological, functional, and molecular photoacoustic imaging, (3) potential clinical applications, and (4) contrast agents for photoacoustic imaging.

About Chulhong Kim Dr. Chulhong Kim studied for his Ph.D. degree and postdoctoral training at Washington University in St. Louis, St. Louis, Missouri. He is currently an Associate Professor of Creative IT Engineering at Pohang University of Science and Technology in Republic of Korea. Before he joined the department, he was an Assistant Professor of Biomedical Engineering at the University at Buffalo. He was the recipient of the 2017 IEEE Engineering Medicine and Biology Society (EMBS) Early Career Achievement Award. He has published 100 peer-reviewed journal articles (Nat. Nanotech., Nat. Mat., Light Science & Applications, etc) and 47 conference proceedings articles. His team also filed and/or registered 56 domestic/international patents. His Google Scholar h-index and citations have reached 38 and over 5,800, respectively. His group's works have been selected for the 2016 and 2017 Seno Medical Best Paper Award Finalists in Photons Plus Ultrasound Conference, SPIE. He has currently served as an Editorial Board Member of Scientific Reports, Photoacoustics Journal, etc. He has served as an Organizing Committee for the conference on "Photons plus Ultrasound" and "High-Speed Biomedical Imaging and Spectroscopy" held annually under auspices of Photonics West and as a Theme Co-Chair for the 39th and 40th Annual International Conference of the IEEE EMBS. He has delivered a numerous invited presentations (>120) in technical conferences and seminars in universities. His research interests are the development of novel biomedical imaging techniques including photoacoustic tomography, ultrasound imaging, etc. Particularly, his lab developed photoacoustic gastro-intestinal tract imaging using organic agents, photoacoustic cystography, clinical photoacoustic/ultrasound imaging scanner, fast optical-resolution photoacoustic microscopy based on a 2-axis water-proof MEMS scanner (Spin-off company: PAMsTECH), virtual intraoperative photoacoustic surgical microscopy, etc.