

Title of talk: Ultrasound Devices for Brain Stimulation and Neuromodulation



Abstract:

In the current aging society, the number of patients suffering from degenerative brain diseases is continuously increasing. However, many of these brain disorders are intractable and difficult to treat. Non-invasive brain stimulation is an attractive alternative method to a pharmaceutical approach that attempts to treat brain disorders through physical stimulation. Among the various direct brain stimulation techniques, such as electrical, magnetic, and optical, ultrasound has been proposed as a new modality for neuromodulation due to its distinct advantages such as high spatial resolution and in-depth targeting. As ultrasound modality is still in the early stages of development, further investigations on various aspects such as neuromodulation mechanism, therapeutic effects, and safety are still required. Although ultrasound technology is a mature biomedical tool developed from ultrasound imaging, many new technological advancements such as miniaturized devices based on microelectromechanical systems (MEMS) technology have been recently introduced for the specific purpose of neuromodulation. In this talk, I will introduce these new neurotools which are essential to uncovering the fundamental mechanisms of ultrasound brain stimulation and ultimately to developing an effective therapeutic means for brain disorders.