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강연제목: 경두개 뇌음향전기 영상화 기술: 미래 뇌 건강 관리를 위한 비침습 고정밀 뇌기능 매핑을 향하여

Transcranial acoustoelectric brain imaging: Towards noninvasive mapping of neuronal current densities for Future Brain Healthcare

Abstract:

Acoustoelectric imaging (AEI) is a new technology that exploits acoustic pressure to transiently interact with physiological currents, generating a radiofrequency signal detected by one or more surface electrodes. Recent advancements in AEI have demonstrated significant progress and hold potential for achieving excellent spatial and temporal resolution simultaneously. When applied to the brain, transcranial acoustoelectric brain imaging (tABI) can overcome limitations with electroencephalography (EEG), which suffers from poor spatial resolution and inaccuracies due to blurring of electrical signals passing through the brain and skull. In tABI, it directly maps fast time-varying current within a defined brain volume at the mm & ms scales while reconstructing the current source density. This invited presentation will describe the underlying physics and mathematics of tABI, recent progress and challenges using numerical simulations and bench-top models, and its potential impact as a cutting-edge noninvasive real-time modality for electrical brain mapping in humans.

Brief Biosketch

Jinbum Kang is currently an Assistant Professor at the Department of Biomedical Software Engineering (BMSW) at the Catholic University of Korea in Korea. He studied for his Ph.D. degree at the Department of Electronic Engineering at Sogang University in Korea and for postdoctoral training at the Department of Bioengineering at University of Washington in Seattle, WA, USA. He was the recipients of the Young Investigator Award in the 13th Congress of the Asian Federation of Societies for Ultrasound in Medicine and Biology (AFSUMB) and in the 16th World Federation of Ultrasound in Medicine and Biology Congress (WFSUMB). His research interests include biomedical ultrasound imaging and its applications.