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강연제목: 독립형 초소형 초저전력 신경 센서 및 자극기의 다중 임플란트 네트워킹을
통한 무선 신경 인터페이스

**Wireless Multi-Implant Networking of Free-Floating, Ultra-Miniaturized, and
Ultra-Low-Power Neural Sensors and Stimulators**

Abstract:

With a rapidly growing number of individuals affected by neurological disorders in a super-aging society, neural implants for diagnosis and treatment have gained increasing recognition. However, current implantable interfaces are mostly limited to localized regions of the brain and rely on commercial off-the-shelf components, which have high power consumption and require large batteries. These limitations reduce the potential benefit of neural implants and hinder clinical translation. To overcome these challenges, our team developed a fully integrated, battery-less, ultra-miniaturized, and ultra-low-power neural implant with the size of only 500 μm by 500 μm . By leveraging advanced semiconductor technology and integrated circuit design, we successfully implemented neural sensing and stimulation, RF energy harvesting, and wireless backscatter communication capabilities into a single microchip. Furthermore, for the first time, we introduced a multi-implant wireless networking approach for microsensors and microstimulators, enabling distributed neural interfaces that can potentially cover larger brain regions. Moving forward, we aim to expand this technology into a scalable wireless neural interface capable of capturing large-scale neural activity across extensive brain regions.

Brief Biosketch

이지훈 교수는 카이스트 뇌인지과학과 조교수로 서울대학교에서 학사·석사 학위를, 브라운대학교에서 박사 학위를 취득했으며, 브라운대학교에서 연구조교수로 근무했다. 그는 초소형 무선 신경 센서·자극기 네트워크 '뉴로그레인(Neurograin)'을 개발하였으며, 현재 신경-전자 보철 연구실(NEP Lab)을 이끌며 이식형·착용형 신경 장치 및 차세대 BMI 시스템 개발을 목표로 연구하고 있다.