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국문 강연제목: 연결성으로 본 뇌의 원리 – 구조에서 인지 역학까지

영문 강연제목: Exploring brain connectivity: From Brain Architecture to Cognitive Dynamics

Abstract(영문):
The brain is an inherently multiscale complex network, spanning from neurons to circuits and large-scale systems. The recent era of connectomics has provided unprecedented opportunities to map structural and functional brain connectivity across multiple scales. However, mapping alone does not reveal how these networks are organized or how they give rise to brain function. To address this gap, computational and theoretical approaches have become indispensable for uncovering the organizational principles of brain networks and for probing how dynamic properties of neural activity emerge from structural connectivity patterns. Together, these advances have converged to form Network Neuroscience—an interdisciplinary field that integrates multiscale and multimodal data, methods, and theory to understand the brain as a networked system. In this talk, I will introduce the past and present of connectomics and network neuroscience, highlight recent progress in brain connectivity mapping and computational modeling, and discuss future directions and challenges for the field.

Brief Biosketch (간단한 이력, 연구/대외활동 소개,국문/영문)
Dr. Byeongwook Lee is an Assistant Professor in the Department of Brain and Cognitive Sciences at KAIST. Dr. Lee received his B.S. in Electrical Engineering and his M.S. and Ph.D. in Bio and Brain Engineering from KAIST, where he investigated the design principles of complex brain networks. He then completed his postdoctoral training at Stanford University, developing computational models to quantitatively characterize dynamic neural activity during cognitive task performance and applying them to real-world neuroimaging data. Dr. Lee's current research focuses on understanding the mechanisms underlying dynamic neurocognitive processes through computational approaches, with a particular emphasis on how these processes are maintained, compensated, or disrupted in aging populations.
이병욱 교수는 현재 KAIST 뇌인지과학과의 조교수로 재직 중이며, 계산 및 시스템 신경과학 분야를 연구하고 있습니다. 이병욱 교수는 KAIST 바이오및뇌공학과에서 뇌 연결성의 설계 원리 탐구를 주제로 박사 학위를 취득하였습니다. 이후 미국 스탠포드 대학교에서 박사후연구원으로 재직하며, 인지기능 수행 중 뇌에서 발생하는 동적 신경 활동을 정량적으로 분석할 수 있는 계산 모델을 개발하고, 이를 실제 뇌 영상 데이터에 적용하는 연구를 수행했습니다. 이병욱 교수는 이러한 계산 신경과학적 접근을 바탕으로 다양한 신경인지 과정의 뇌 회로 메커니즘을 탐구하고 있으며, 특히 노화 집단을 중심으로 인지 기능 수행 중 뇌의 동역학이 어떻게 보존, 보상, 또는 붕괴되는지를 규명하는 데 주력하고 있습니다.