Redefining MRI:
From Image to Insight

ICMRI 2026
THE 14th INTERNATIONAL CONGRESS ON MRI
& 31st ANNUAL SCIENTIFIC MEETING OF KSMRM

AUGUST 27 - 28, 2026
Grand Walkerhill Seoul, Seoul, Korea
https://icmri.ksmrm.org/2026m

MD-PhD Cross Talks

SY17-2

Inter-Modality Image Translation

Hyunyeol Lee

Kyungpook National University, Korea

Inter-modality image translation aims to synthesize the imaging characteristics of one modality from another, enabling complementary diagnostic information without additional scans. This lecture presents two applications that bridge the gap between magnetic resonance imaging (MRI) and computed tomography (CT).

The first part addresses CT-like skull bone imaging derived from MRI. Conventional MRI provides poor contrast for cortical bone due to its extremely short transverse relaxation time. Leveraging ultrashort echo time (UTE) MRI, we capture signals from the skull and translate them into CT-like bone images, allowing radiation-free visualization of osseous structures that is particularly valuable for pediatric and repeated-imaging settings.

The second part focuses on CT-based brain analysis, where structural information typically reserved for MRI is extracted directly from CT. We demonstrate CT-based brain segmentation and, more challengingly, hippocampus segmentation—structures whose soft-tissue contrast is inherently limited on CT. By translating CT into MRI-informed representations, anatomically meaningful segmentation becomes feasible even without a corresponding MR scan.

Together, these approaches illustrate how inter-modality translation expands the diagnostic reach of each modality, reducing radiation exposure, scan burden, and cost while preserving clinically essential structural detail.

Keywords: *MRI, CT, Image translation, Bone, Brain*