Speaker: Jae-Weon Lee (Jungwon University)

Title: Quantum entanglement, gravity and machine learning

Abstract:
Quantum entanglement lies at the heart of quantum information and has emerged as a key principle linking gravity, spacetime structure, and quantum computation.
I begin with the foundations of entanglement and computational complexity, then discuss how entanglement provides a new perspective on the Einstein equation, the black hole information paradox, and dark energy. I explore a perspective in which the Universe itself may be viewed as a quantum computer, or even as a form of quantum machine learning, with physical phenomena interpreted as manifestations of underlying quantum computation. In this context, concepts such as magic, originally developed in quantum computation, acquire new significance in particle physics. Together, these ideas suggest a unified framework in which quantum information processing plays a fundamental role in our understanding of the Universe.