



Applied Statistics Seminar

MPCR: Multi- and Mixed-Precision Computations Package in R

Time: October 24, 2024 (Thursday) 4:00 - 5:00 p.m.

Place: Natural Sciences Building #701

Speaker: Prof. Minwoo Kim (Pusan National University)

Abstract: Although lower floating-point precisions were used in early computers where memory was highly constrained, 64-bit precision has become prominent in modern systems, particularly in computational statistics and scientific computing, due to its ability to minimize numerical errors and handle complex calculations. In some cases, however, double-precision accuracy may exceed the requirements of certain applications, leading to interest in lower-precision alternatives that can reduce computational complexity while maintaining the necessary accuracy level. This trend has been amplified by new hardware optimized for low-precision computations, such as NVIDIA's Tensor Cores (V100, A100, and H100 GPUs), Intel CPUs with Deep Learning (DL) boost, Google Tensor Processing Units (TPUs), Field Programmable Gate Arrays (FPGAs), ARM CPUs, and others. While lower precision may introduce numerical and accuracy issues in some applications, many have shown robustness to these computations, sparking the development of new multi- and mixed-precision algorithms that balance accuracy and computational cost. To address this, we introduce MPCR, a novel R package supporting three different precision types (16-, 32-, and 64-bit) and their combinations. It is designed for use in common Frequentist and Bayesian statistical examples.

Host: Jaehong Jeong (Spatial Statistics Lab)