THE UNIVERSITY OF CHICAGO | THE COMMITTEE ON COMPUTATIONAL AND APPLIED MATHEMATICS

COLLOQUIUM

YUEHAW KHOO

Department of Statistics, Computational and Applied Mathematics
University of Chicago

High-Dimensional Linear Algebra

WEDNESDAY, October 1st at 4:30 PM
Jones 303, 5747 S. Ellis Ave. Chicago, IL 60637

ABSTRACT

Numerical linear algebra has been a cornerstone of scientific computing in the 20th century, particularly for solving 1D–3D partial differential equations. Yet, when faced with high-dimensional problems, traditional linear-algebraic approaches encounter the curse of dimensionality, prompting a shift toward highly nonlinear approximations—most notably deep neural networks trained via non-convex optimization. Based on tensor-networks, I will highlight how simple linear algebraic operations remain surprisingly powerful in modern high-dimensional contexts such as artificial intelligence and many-body physics. These techniques give rise to a suite of optimization-free algorithms that sidestep the difficulties of non-convexity with optimal run time.

Organizers:
Guillaume Bal, Department of Statistics (CCAM), guillaumebal@uchicago.edu & Nisha Chandramoorthy, Department of Statistics (CCAM), nishac@uchicago.edu, Daniel Sanz-Alonso, Department of Statistics (CCAM), sanzalonso@uchicago.edu

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