



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PURE MATHEMATICS

DNA Data Storage: A Geometric Approach

by

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Abstract

The rapid growth of digital information has motivated the search for new storage technologies with extremely high density and long-term durability. DNA has emerged as a particularly promising medium: information can be encoded into synthetic DNA molecules, stored for long periods of time, and subsequently recovered through sequencing. This paradigm, however, gives rise to several new coding-theoretic challenges, including errors, missing strands, constrained synthesis, and efficient random access to selected pieces of information.

In this talk, I will discuss how some of these problems can be studied from a geometric point of view. In particular, coding schemes can be represented through configurations of vectors and subspaces over finite fields, turning questions about data recovery and random access into problems concerning spans, coverings, and incidence properties in finite geometries.

This perspective creates a bridge between DNA data storage, coding theory, and finite geometry, and suggests new connections with combinatorial optimization and service-rate problems. I will present the basic framework, illustrate some of the resulting geometric questions, and discuss possible directions for developing coding schemes specifically adapted to DNA-based storage systems.

Date : 19 August 2026 (Wednesday)

Time : 3:10p.m. – 4:00p.m.

Venue : Room 4504 (near Lift 25/26)

All are Welcome!