



**THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY**

**Department of Mathematics**

**SEMINAR ON DATA SCIENCE  
AND APPLIED MATHEMATICS**

**On Mapper - a graphical analysis of  
high-dimensional data**

**By**

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**Abstract**

Topological Data Analysis (TDA) is a modern approach for analysing complex datasets using tools from algebraic topology, the branch of mathematics concerned with studying the *shape* of spaces. Unlike conventional statistics, which often assumes linear or low-dimensional structures, TDA is designed to uncover hidden patterns and global organisation in high-dimensional and noisy data. There are two main approaches to TDA: Persistent Homology (PH) and Mapper. In this talk, we will focus on Mapper, which creates a simplified graph-based representation of high-dimensional data. It works by partitioning the dataset, analysing local structures, and connecting them into a network called a Mapper graph. We end by discussing an application for breast cancer analysis.

**Bio:** Cerene Rathilal is an early-career academic at the University of KwaZulu-Natal in Durban, South Africa. She specialises in Topology with a focus on pointfree topology, and more recently has placed efforts in growing a Topological Data Analysis group in SA. As part of her academic citizenship, Cerene is an assistant focus area coordinator (FAC) at the Centre of Excellence in Mathematical and Statistical Science (CoE-MaSS) for Algebra and Topology in SA, a founding member of the South African Mathematical Society (SAMS) Women's Division and founder of a national outreach programme called STEM MentHER.

**Date : 9 December 2025 (Tuesday)**  
**Time : 2:00p.m.-3:00p.m.**  
**Venue : Room 1410 (near Lift 25/26 )**

*All are welcome*