Project Title: Functional Data Analysis for Cohort Dynamics

Project Description: This project is focused on the development and application of novel functional data analysis (FDA) methods designed to model how cohorts evolve over time. The primary goal is to apply and develop new techniques that move beyond standard approaches such as functional PCA (fPCA). The cohort-based methods will first be applied to examine dynamics in human cohorts, drawing on large-scale demographic and social data. As the project progresses, these methods may be extended to other cohort-based tasks, such as modeling the reliability and lifecycle of product vintages. The techniques used will include elastic fPCA, tensor decompositions, manifold-valued functional data analysis, and compositional data analysis.

The ideal candidate is a student with programming experience in R or Python and a keen interest in learning and applying advanced methods. Familiarity with the foundational concepts of functional data analysis or temporal analysis would be a significant asset, but is not required.

Supervisor: Prof. Ethan Fosse

Application: Please submit your CV, unofficial transcript, and a single paragraph describing your interest in the project in an email to Prof. Ethan Fosse (ethan.fosse@utoronto.ca).

Start Date: Fall 2025 or Winter 2026

Research Area: Data Science, Machine Learning, Operations Research, Information Engineering