

# Data Science Seminar Series

Wednesday, January 25, 11:30-12:30 pm, virtual/Teams

## TITLE

An Unsupervised Framework for Comparing Graph Embeddings

## SPEAKER

Dr. Pawel Pralat

## ABSTRACT

The goal of many machine learning applications is to make predictions or discover new patterns using graph-structured data as feature information. In order to extract useful structural information from graphs, one might want to try to embed it in a geometric space by assigning coordinates to each node such that nearby nodes are more likely to share an edge than those far from each other. There are many embedding algorithms (based on techniques from linear algebra, random walks, or deep learning) and the list constantly grows. As a result, selecting the best embedding is a challenging task and very often requires domain experts. Our general framework assigns the divergence score to each embedding which, in an unsupervised learning fashion, distinguishes good from bad embeddings. In order to benchmark embeddings, we generalize the Chung-Lu random graph model to incorporate geometry.

## BIOGRAPHY

Dr. Pawel Pralat is a full professor of mathematics at Toronto Metropolitan University and the Director of Fields-CQAM Lab on Computational Methods in Industrial Mathematics at The Fields Institute for Research in Mathematical Sciences. His main research interests are in modelling and mining complex networks. Since 2006, he has written 190+ papers and 3 books with 140+ collaborators. He is trained both in (theoretical and applied) computer science as well as mathematics, has strong programming and applied research skills, gained through experience in collaboration with the private sector as well as the Government of Canada.

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