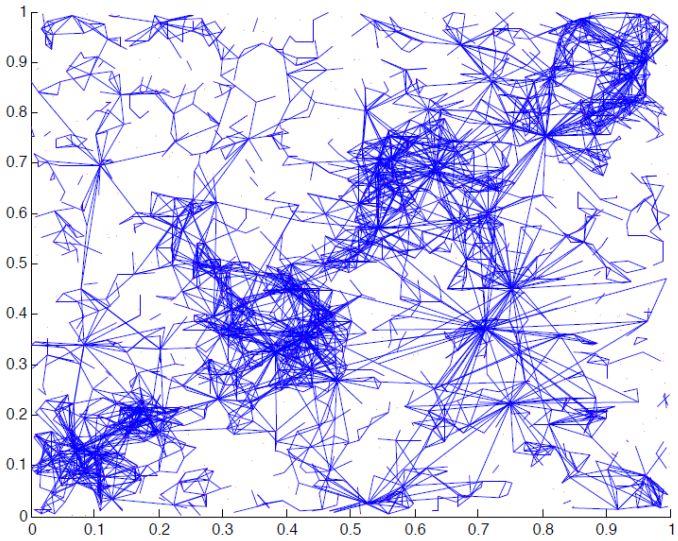
Jeannette Janssen

Discrete Mathematics

Geometric graphs and Complex networks: Online social networks, networks of interactions between the proteins in a cell, and the network of neural connections in the brain are examples of large complex networks. Dr. Janssen is interested in modelling such networks. Random geometric graphs can be very helpful in modelling complex networks. The placement of the vertices in a geometric space can model similarities and shared interests: vertices that have similar profiles are placed close together in the space and are more likely to be linked. The crucial question then becomes: given only the link structure of a geometric graph, is it possible to retrieve the placement of the vertices?



Spread of information: How fast does information spread through a complex network, and does it reach all nodes? Which vertices should be "inoculated" to halt the spread of a virus or malicious rumour?

Infinite graphs: Some aspects of the structure of large graphs can be better understood by studying graphs with an infinite number of vertices.

Graph colouring: What is the minimal number of colours required to colour the vertices of a graph, so that no two adjacent vertices have the same colour? How does the answer change if each vertex has a list of forbidden colours?

For more information, contact:
Dr. Jeannette Janssen
jeannette.janssen@dal.ca
dal.ca/mathstat

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MATHEMATICS AND STATISTICS