On the large-scale geometry of graphs

Abstract:

A graph is automatically also a metric space, but is there anything interesting to say about such metric spaces? Many fascinating and concrete questions are encapsulated in the more general (and vague) question "to what extent can a finite graph emulate the properties of a infinite regular tree?". We will see how this leads us to investigate expansion in graphs and questions about the large scale aspects of graph metrics including girth and diameter and the relations between the two. If time permits (probably not) I may also say a little about the local geometry of graphs.

This talk is based on many collaborations which I have had over the years, among my more recent collaborators are Michael Chapman, Yuval Peled and Yonatan Bilu. The talk requires no particular previous background and should be accessible to general mathematical audience.