1164-35-151 **Jeff Calder**, **Nicolas Garcia Trillos*** (garciatrillo@wisc.edu) and **Marta Lewicka**.
Regularity estimates and uniform convergence in the large data limit of graph Laplacian eigenvectors on random data clouds.

Graph Laplacians are omnipresent objects in machine learning that have been used in supervised, unsupervised and semi supervised settings due to their versatility in extracting local and global geometric information from data clouds. In this talk I will present an overview of how the mathematical theory built around them has gotten deeper and deeper, layer by layer, since the appearance of the first results on pointwise consistency in the 2000's, until the most recent developments. This line of research has found strong connections between PDEs built on proximity graphs on data clouds and PDEs on manifolds and has given a more precise mathematical meaning to the task of "manifold learning". I will give particular emphasis to recent work with Jeff Calder and Marta Lewicka, where we use newly developed regularity theory for graph Laplacians in order to obtain uniform and almost C {0, 1} convergence rates of eigenvectors of graph Laplacians on proximity graphs towards eigenfunctions of Laplace-Beltrami counterparts. (Received January 17, 2021)