1108-94-325   **Hau-Tieng Wu*** (`hauwu@math.toronto.edu`), Department of Mathematics, University of Toronto, Toronto, Ontario , Canada, and **Noureddine El Karoui**, **Stefano Marchesini**, **Yu-Chao Tu** and **Amit Singer**. *Graph connection Laplacian and ptychographic image processing.*

Spectral methods like Diffusion Maps and Laplacian Eigenmaps in data analysis are based on eigenvectors and eigenvalues of graph Laplacians. Recently, we introduced a generalized framework called the graph connection Laplacian (GCL) as a new framework to data science. In this talk, in addition to showing that under the principle bundle framework, the eigenvectors and eigenvalues of the GCL converge to the connection Laplacian of the associated vector bundle in the limit of infinitely many i.i.d. random samples, we show how the noise impacts the GCL framework. An application of this framework to the ptychography imaging problem based on GCL will be discussed to show the strength of the proposed framework. This is a joint work with Noureddine El Karoui, Stefano Marchesini, Yu-Chao Tu and Amit Singer. (Received January 17, 2015)