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Problems related with graph matching are very important both from a theoretical and practical point of view, with several applications from image and video analysis to biological and biomedical problems. In this talk we will cover both aspects of this challenging problem.

First, a graph matching algorithm will be presented, combining sparsity ideas with relaxations of the graph matching problem, yielding a robust method, particularly well suited for multimodal data. Then, new probabilistic results about convex and non-convex relaxations of the graph matching problem will be discussed, also suggesting some practical considerations. Finally, new spectral results will be presented, proving the equivalence for the graph matching problem and a relaxed version for certain graphs, also shedding light to the relationship between spectral properties and the automorphism group of a graph.

Joint work with Guillermo Sapiro (Duke University, USA), Pablo Sprechmann (New York University, USA), Joshua Vogelstein (Duke University, USA), Pablo Musé (Universidad de la República, Uruguay), Vince Lyzinski (Johns Hopkins University, USA), Donniell Fishkind (Johns Hopkins University, USA) and Carey E. Priebe (Johns Hopkins University, USA)..