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*Learning over very large graphs*

Today, many important learning applications harness data in the form of large graphs. Companies like Amazon, Google, and Facebook use graphs to link similar or related entities; these graphs often have millions or billions of nodes, and are not stored on a single server, but over distributed systems. On the other hand, many graph learning methods today rely on an offline large matrix inversion, where the matrix is the size of the graph itself; this is computationally infeasible in the aforementioned application.

In this talk, we will consider graph learning through the lens of online node label prediction, and its close relationship to fast Laplacian matrix inversion. We introduce *\*local methods\**, of whose complexity is independent of the graph size, and show its promise in large graph learning; the most famous is the approximate page-rank algorithm used in many web applications. We then discuss the fundamental issues in developing local graph methods, such as acceleration, parallelization, and their integration in scalable large graph learning.