

# Graph Partitioning for Dynamic, Adaptive and Multi-phase Computations

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**Abstract.** Algorithms that find good partitionings of highly unstructured graphs are critical in developing efficient algorithms for problems in a variety of domains such as scientific simulations that require solution to large sparse linear systems, VLSI design, and data mining. Even though this problem is NP-hard, efficient multi-level algorithms have been developed that can find good partitionings of static irregular meshes. The problem of graph partitioning becomes a lot more challenging when the graph is dynamically evolving (e.g., in adaptive computations), or if computation in multiple phases needs to be balanced simultaneously. This talk will discuss these challenges, and then describe some of our recent research in addressing them.