1106-05-2367 **Blair D. Sullivan*** (blair_sullivan@ncsu.edu). *Adding Structure to Network Science.*

Rapid growth in data is providing scientists with novel opportunities to improve understanding of complex systems but also with significant challenges in analysis. A key missing component is scalable methods that identify patterns and translate them into domain knowledge. One can naturally represent much of the data as graphs (encode relationships in edges), but this leads to a hodgepodge of ad hoc methods that often resort to heuristics as rigorous approaches don't scale.

On the other hand, the theoretical community has long known that graph structure can have a huge impact on algorithmic complexity- this is a primary tenet of fixed parameter tractability (FPT). Unfortunately, directly applying FPT algorithms is typically infeasible due to large hidden constants in the complexity and parameters' fragility to small edits of the edge set.

We discuss initial work on fitting real-world networks into the sparse graph hierarchy, using broader classes (e.g. bounded expansion), random graph models, and empirical evaluations. We also mention algorithmic advances, geometric tree-like structure (hyperbolicity), and applications in social networks/neuroscience. Joint work with E. Demaine, M. Farrell, T. Goodrich, N. Lemons, F. Reidl, P. Rossmanith, F. Sánchez Villaamil & S. Sikdar (Received September 16, 2014)