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Allen Tannenbaum* (arobertan@cs.stonybrook.edu), Department of Computer Science, New Computer Science Building, Stony Brook, NY 11794. *Generalized Curvature for the Modeling and Control of Complex Networks.*

The importance of studying properties of networks is manifest in diverse fields ranging from engineering, biology, physics, chemistry, neuroscience, and medicine. The functionality of networks with regard to performance, throughput, reliability and robustness is strongly linked to the underlying geometric and topological properties, which is the focus of the proposed research program. The fundamental mathematical abstraction of a network as a weighted graph brings to bear the tools of graph theory—a highly developed subject of mathematical research. But more importantly, recently proposed geometric notions of curvature on very general metric measure spaces, allow us to utilize a whole new set of tools and ideas that help quantify functionality and robustness of graphs. We will thus explore curvature, graph Laplacian, and Ricci flows over networks as well as study limits of stochastic networks as the number of nodes tends to infinity and how these relate to ideas from mean field games via the intrinsic network geometry.

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