1163-55-1279 **Cliff A Joslyn*** (cliff.joslyn@pnnl.gov), 1100 Dexter Ave. # 500, Seattle, WA 98109. *Finite Topologies and Hypergraphs: Essential Tools for Network Science.*

Complex systems and network science researchers are increasingly turning to higher levels of mathematical abstraction in order to faithfully capture the properties of complex systems. Specifically, hypergraphs and abstract simplicial complexes (along with labeled, directed, attributed, and ordered versions of these) are increasingly popular to model multidimensional structures and high order interactions (i.e., more than binary relations and primary effects) frequently present in complex systems. As mathematical objects, these multi-dimensional graph structures stand poised to connect applied network science to computational topology, in light of the deep connections between hypergraphs as finite set systems, finite partial orders and distributive lattices, and finite topologies. Conversely, topological structures useful in computational topology applications can be interpreted in a combinatorial perspective in the context of hypergraphs and complex networks. I will present a perspective on the finite topologies associated with hypergraphs, and how our research group is using them for both homological analysis of relational data and data-driven topological sheaves. (Received September 15, 2020)