1125-18-626 **Michael Robinson*** (michaelr@american.edu), Department of Mathematics and Statistics, American University, 4400 Massachusetts Ave NW, Washington, DC 20016. *Local topological analysis of complex systems.*

Complex predictive models are notoriously hard to construct and to study. Sheaf theory provides a toolbox for constructing predictive models described by systems of equations. Without referring to the models directly – only that a model consists of spaces and maps between them – the most readily apparent feature of a multi-model system is its topology. This topology should be modeled first, and then the spaces and maps of the individual models be specified in accordance with the topology. The power of this approach is that complex models can be assembled from smaller, easier-to-construct models. This talk will explain how a disciplined, diagrammatic process (co)sheafifies continuous dynamical systems, partial differential equations, probabilistic graphical models, and discrete approximations of these models. Shadows of the sheaf theoretic perspective are apparent in a variety of disciplines, for instance in the construction of volume meshers (which construct pullbacks and pushforwards of sheaves of functions), finite element solvers (which construct the space of global sections of a sheaf), and loopy belief propagation (which iteratively determines individual global sections). (Received September 08, 2016)