1117-92-548 **Caner Kazanci*** (caner@uga.edu), Department of Mathematics, 200 D W Brook dr., Athens, GA 30602. *Decomposing networks representing living systems without breaking connections.*

Living systems are often represented by networks, with links representing relations (e.g. biochemical reactions, regulation, feeding) among entities (e.g. molecules, genes, tissues, organisms, species). Such networks can be fairly large and complex. Decomposing a system into smaller sub-networks for detailed analysis is often tempting. However, essential system-wide behavior may be lost by breaking connections, or excluding nodes.

Motivated by flux based analysis and metabolic control analysis, we propose an alternative building block for such networks: a minimal set of sub-networks that can theoretically sustain themselves. Since connections are not totally lost during such decomposition, complex system-wide properties may still be analyzed with little to no information loss. Furthermore, any result obtained using such decomposition will hold regardless of size or complexity of the model.

In this talk, we define the minimal set of sub-networks for a given network model, and discuss how system-wide properties of an entire system can be studied using only these sub-networks, and demonstrate this on a specific model using a Beta version of an online modeling, simulation and analysis software we developed. (Received January 20, 2016)