1135-AA-1729   **Elena S. Dimitrova*** (`edimit@clemson.edu`), **Reinhard Laubenbacher** and **Linda H. Shapiro**. *A discrete multiscale modeling perspective to the innate immune response to ischemic injury.*

Regardless of the initial insult, optimal healing of damaged tissue relies on the precise balance of pro-inflammatory and pro-healing processes of innate inflammation to the extent that variations in either arm can exacerbate many diseases, from obesity to autoimmunity. In this talk, we will present a discrete multiscale mathematical model that spans the tissue and intracellular scales, and captures the consequences of targeting various regulatory components of injury-induced TLR4 signal transduction on potential pro-inflammatory or pro-healing outcomes. We apply known interactions to simulate how inactivation of specific regulatory nodes affects dynamics in the context of injury and to predict phenotypes of potential therapeutic interventions. We propose logical rules to link model behavior to qualitative estimates of pro-inflammatory signal activation, macrophage infiltration, production of reactive oxygen species, and resolution. It will be described how the mathematical model can form the basis of a conceptual framework focusing on TLR4-mediated ischemic repair to assess potential molecular targets that can be utilized therapeutically to improve efficacy and safety in treating ischemic/inflammatory injury. (Received September 24, 2017)