1154-92-2486 **Swati Patel*** (spatel20@tulane.edu) and **Scott McKinley**. *Proteins with random effects become evolutionary capacitors.*

Evolution plays a fundamental role in the persistence of natural populations, including favorable ones, such as keystone species, or harmful ones, such as pathogens. Understanding how populations evolve has the potential to shape how we think about conservation as well as combating diseases. Classically, we have thought populations evolve through novel mutations, which may be beneficial and allow a population to adapt to new environments. More recently, scientists have suggested that certain proteins mask the function of mutations, allowing for them to accumulate and be "stored", for when they are needed. These proteins are called "evolutionary capacitors". While this seems extraordinary, some have argued that such a phenomenon of hiding genetic variation should be common amongst regulatory proteins. They suggest this pattern is purely the outcome of complex epistasis, i.e., nonlinear effects of proteins and mutations on traits, and the selection process. In this talk, I will give examples of proteins hypothesized to be evolutionary capacitors and then present a stochastic model that accounts for complex epistasis to test this hypothesis. Finally, I will discuss how structure in the randomness may impact whether a focal protein evolves to be an evolutionary capacitor. (Received September 17, 2019)