1173-92-315 **Robin Davies**, Jefferson College of Health Sciences, **Isadora Deal**, School of Medicine, University of South Carolina, and **Matthew Macauley*** (macaule@clemson.edu), School of Mathematical & Statistical Sciences, Clemson University. *Boolean models of the transport, synthesis, and metabolism of tryptophan in E. coli.* Preliminary report.

The tryptophan (trp) operon in E. coli codes for the proteins responsible for the synthesis of the amino acid tryptophan from chorismic acid. The tryptophanase (tna) operon codes for those needed to transport and metabolize it. Both of these have been modeled individually with differential equations under the assumption of mass-action kinetics. Recent work has provided strong evidence for bistable behavior of the tna operon. In this talk, we will show how a Boolean model can capture this bistability. We will also develop and analyze a Boolean model of the trp operon. Finally, we will combine these two to create a single Boolean model of the transport, synthesis, and metabolism of tryptophan. In this amalgamated model, the bistability disappears, presumably reflecting the ability of the trp operon to produce tryptophan and drive the system toward homeostasis. Analysis of these models will use computational algebra over GF(2). (Received September 21, 2021)