1014-92-918 **Tanya Leise*** (tleise@amherst.edu), Dept of Mathematics and CS, Amherst College, Amherst, MA 01002. *Modeling the molecular mechanisms of circadian rhythms and their response to light.*

The circadian system maintains a 24-hour rhythm that controls many physiological processes. It entrains to a regular schedule, predominantly the light-dark cycle, allowing the body to anticipate and prepare for the usual activities of the day like waking and eating. The suprachiasmatic nuclei (SCN) in the hypothalamus acts as the "master pacemaker" and responds rapidly to changes in the light-dark cycle. Within the cells of the SCN, a negative feedback loop controlling the expression of clock genes generates rhythmicity. We extend the Leloup-Goldbeter model (a system of nonlinear ordinary differential equations describing the expression of the dominant clock genes in mammals) to include more detailed light response mechanisms. We apply this extended model to test hypotheses of how light affects the expression of particular clock genes, leading to a new prediction of how the response mechanisms differ between species like mice and rats, based on clues from published experiments. (Received September 26, 2005)