1086-VG-864 **Badal Joshi*** (joshi@umn.edu), joshi@umn.edu, and **Mainak Patel**. *Stochastic switching and alternating activity bouts resulting from mutual inhibition and applications to sleep-wake cycling in mammals.*

'Sleep-active' and 'wake-active' neurons in the brains of mammals are thought to inhibit each other resulting both in discrete states of sleep and wake and switching between the two states. New behavioral data sheds light on the underlying neurophysiology. In infants, both sleep and wake bout durations have an exponential distribution with independent regulation of bout means. This suggests stochastic switching in a bistable system, and so we modeled this system as a pair of coupled, mutually inhibitory neurons receiving noisy driving currents. We examined bout durations of the two neurons, switching mechanisms, and dependence on system parameters. Regardless of parameter choices, we found that bout durations of a neuron are always exponentially distributed. Furthermore, bout switches were found to be primarily a consequence of release from inhibition rather than escape via excitation, and we found that inhibition allows independent control over bout lengths of the two neurons. (Received September 18, 2012)