



BI-CO MATH COLLOQUIUM

Monday 11/11 @ 4pm in Park 338



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Please contact Access Services at extension 7351 if
accommodations are needed.

A mathematical model of temperature effects on human sleep regulation

Sleep is a behavioral state in which we spend nearly one third of our lives. This biological phenomenon clearly serves an important role in the lives of most species. While much effort has been put forth in understanding the nature of sleep, many aspects of sleep are still not well understood. Here, we present a Morris-Lecar type, ODE model of human sleep-wake regulation with thermoregulation and temperature effects. Simulations of this model show features previously presented in experimental data such as elongation of duration and number of REM bouts across the night as well as the appearance of awakenings due to deviations in body temperature from thermoneutrality. The model highlights how temperature effects interact with sleep history to effect sleep regulation. We will discuss the dynamics associated with the model as well as how the model could be used as a foundation for experimental simulations pertaining to jet lag, sleep deprivation, and temperature effects on sleep.