1135-92-2715 **Cecilia Diniz Behn*** (cdinizbe@mines.edu), Colorado School of Mines, Department of Applied Math and Statistics, 1500 Illinois Ave., Golden, CO 80401, and **Kelsey Kalmbach** and **Victoria Booth**. *A map-based approach to understanding sleep/wake dynamics in early childhood.*

A homeostatic need for sleep increases with time awake and decreases during sleep, and the dynamics of this process change across development. In adult humans, interactions between the homeostatic sleep drive and the $\sim$ 24h circadian drive produce one nighttime sleep episode per day. By contrast, preschool children experience two sleep episodes per day: a daytime nap and nighttime sleep. To investigate the role of the dynamics of the homeostat in the transition between one and two sleep episodes per day, we analyzed bifurcations in a model for human sleep/wake dynamics as the time constants related to the build up and recovery of sleepiness are varied. As the time constants decrease, the system exhibits an incremental increase in the number of sleep episodes per day. Using a one-dimensional map to represent the dynamics of the system, we relate this map to a normal form for a piecewise continuous system which undergoes a border collision bifurcation, and we provide numerical evidence for period-adding behavior. This analysis has implications for understanding the dynamics of the transition from napping to non-napping behavior in early childhood. (Received September 26, 2017)