1014-92-1173 **Costa M. Colbert*** (ccolbert@uh.edu), Univ of Houston, 4800 Calhoun Rd., Houston, TX 77204-5513. *Conditional Back-Propagation of Dendritic Action Potentials in CA1 Pyramidal Neurons: Implications for Spike-Timing Dependent Synaptic Plasticity.*

Spike-timing plasticity is a form of Hebbian synaptic plasticity in which the arrival times of individual action potentials determine the amplitude and sign of changes in synaptic weight. The ability of neurons to identify small differences in arrival times suggests that the postysnaptic signal is carried by a brief event such as a back-propagating dendritic action potential (bAP). However, the bAPs, while temporally correlated with the firing of the postsynaptic neuron, are not all-or-none with respect to amplitude or to the extent of propagation. Both the dendritic morphology and the prior history of neuronal activation (i.e., local dendritic depolarization and/or previous firing) contribute to the local amplitude of the bAP within any dendritic branch. Thus, through its effects on the bAP, prior activity compartmentalizes the neuron into domains where the induction of spike timing plasticity may proceed independently. I will present the cellular mechanisms that determine the dynamics of the propagation of dendritic bAPs and briefly discuss how these dynamics may extend synaptic learning rules for these neurons. (Received September 27, 2005)