

**Meeting:** 1007, Santa Barbara, California, SS 1A, Special Session on Dynamical Systems in Neuroscience

1007-92-31            **Frank Hoppensteadt\*** ([frank.hoppensteadt@nyu.edu](mailto:frank.hoppensteadt@nyu.edu)), Bobst Library, 70 Washington Square South, Room 1232, New York, NY 10012. *Epineuronal Memory*.

How can a brain maintain stable memories and behaviors when its underlying electrical and chemical structures are constantly changing? We investigate this stability problem thinking that the state variables (eg., voltages, ionic currents, etc.) are governed by a complex system that itself is closely regulated. Regulation of the network is through its operating environment, which is described by parameters. We study a standard neural network model, but one whose parameters are governed by a mnemonic landscape function. Parameter configurations are attracted to local maxima of this landscape, which represent memorized parameter configurations. The operating environment changes slowly (relative to the state variables) guided by the mnemonic landscape function, and this provides a quasi-static operating environment for the network. We describe shaping the mnemonic landscape, how it acts as a probability density function to guide slow parameter dynamics, and how the parameters shape the network output. Simulations of memory registration, activity patterns, and sequential recall are described. (Received December 17, 2004)