“Response of neurons in the brain region locus coeruleus to stimuli”

Experimental data show that neurons in a region of the brain known as the locus coeruleus (LC) can exhibit two distinct firing patterns which are strongly correlated with performance on cognitive tasks. In the phasic mode, associated with good performance, the baseline firing rate is lower and the neurons show enhanced response. In the tonic mode, associated with poor performance, the average baseline firing rate is higher and the neurons are less responsive. From membrane voltage and ion channel equations, we derive a phase oscillator model for LC neurons. Average firing probabilities of a pool of neurons in response to stimuli over many trials are then computed via a probability density formulation. Using this, we show that: (1) Response is elevated in populations with lower baseline firing rates; and (2) response decays due to noise and distributions of neuron frequencies. These results may account for much of the experimental response variability.

Graduate students are invited to attend.

Dr. Moehlis is a candidate for a faculty position.

Tea will be served in HA 243 at 3:30 p.m.