Abstract for the workshop on Theoretical and
Computational Biology at MSU, 24 April 1999

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Title and presenter:

"PERCEPTUALLY RELEVANT MODELS OF NEURAL
EXCITATION IN THE AUDITORY SYSTEM"

W.M. Hartmann

[Note the speaker is an event coordinator for Science Olympiad on the day of the talk. He expects to be available to give the talk after 2 pm.]

Neurons of the auditory system are tuned throughout the auditory pathway from the cochlea, through the midbrain, to the cortex. The driven firing rate as a function of neuron characteristic frequency constitutes the tonotopic character of the excitation pattern. In addition, neurons synchronize to the auditory input, and measures of synchrony, such as the REVCOR function, constitute the timing character of the excitation pattern. Neural excitation patterns at different stages of the pathway may be calculated from models of cochlear mechanics followed by the known or presumed processing in the succeeding midbrain nuclei. Alternatively, phenomenological excitation patterns may be created to fit a wide variety of physiological and psychoacoustical facts. The nonlinear interactions of neural excitation patterns from different tone and noise sources are responsible for the psychophysical effects of masking and loudness reduction, and for a wide variety of pitch shift phenomena.

Today's talk will demonstrate the tonotopic principle applied to two effects. The first effect is an unmasking harmonic salience effect, the second is a tone-on-tone repulsion effect leading to a pitch shift.

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