

# Modeling Weakly Connected Networks of Neural Oscillators with Spiking Neurons

Iren Valova

Natacha Gueorguieva

George Georgiev

*Abstract* - The goal of this research is to investigate the relationships between synaptic organizations (anatomy) of the neural networks and the dynamical properties (function) of weakly connected networks of neural oscillators. It is shown how certain parameters of the spiking neuron model can be used to represent these dynamics. The two proposed modes are based on the two

main cell types in the olfactory bulb, the mitral and granule cells. The dynamics that have been simulated include the reciprocal and lateral inhibition of mitral cells by granule cells, as well as the saturation of mitral cells. The simulations show how certain spike inputs to mitral cells correspond to cortex recognition and discrimination in the olfactory bulb.