

## **BRAIN DYNAMICS MODELING VIA SPIKING NEURON SIMULATOR**

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### ***ABSTRACT***

Spiking neuron systems are based on biologically inspired neural models of computation since they take into account the precise timing of spike events and therefore are suitable to analyze dynamical aspects of neuronal signal transmission. Further more, they are closer to biophysical models of neurons, synapses, and related elements and their synchronized firing of neuronal assemblies could serve the brain as a code for feature binding and pattern segmentation.

In this research we develop a Spiking Neuron Simulator (SNS) with seven input generators (Sin Waves, Absolute Sin Waves, Random Noise, Discrete Noise, Pulse EXP, Pulse CST, and Square Wave) and three membrane potential outputs: Integrate & Fire, Spike Long Potential, and Spike Short Potential Experiment. SNS includes the following four layers: sensory, sub-cortical 1, sub-cortical 2, and cortical layer. Our SNS simulator demonstrates the neurons ability to fire on a particular threshold, as well as, how many times and at what intensity the spikes would fire within a particular time period and a particular constant input.