



The Chinese University of Hong Kong
Non-confidential Abstract of Technology Disclosure

Title:

Field Programmable Gate Array Implementation of Neuronal Ion Channel Dynamics in Real Time

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Inventor:

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Non-confidential abstract:

Neuron-machine interfaces such as dynamic clamp and brain-implantable neuro-prosthetic devices require realtime simulations of neuronal ion channel dynamics. Field programmable gate array (FPGA) has emerged as a highspeed digital platform for application-specific computation devices. Here, we present an FPGA design of a neuromorphic Hebbian synapse which mimics the NMDA and non-NMDA ion channel dynamics observed experimentally in hippocampal neurons. The proposed design can be readily extended to highspeed implementations of dynamic clamp and neuroprosthetics as replacements for damaged neurons in the brain.

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