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Synaptic Rewiring in Neuromorphic VLSI for Topographic Map Formation

Prof. Simeon Bamford
Department of Informatics, Edinburgh University

ABSTRACT OF THE TALK

The term neuromorphic was coined by Carver Mead, in the late 1980s to describe Very Large Scale Integration (VLSI) systems containing electronic analog circuits that mimic neuro-biological architectures present in the nervous system.
I will talk about topographic, largely neuronal maps in biology, how I've modelled their development, and how I've implemented this model in neurmorphic VLSI. I will focus on Address-Event Representation (AER), a protocol for transmitting neural pulses, and will present a design for an AER receiver which is optimised for scalability as connection fan-out increases. I'll further discuss the rewiring of connections and will present a circuit for calculating Euclidean distance across a chip.

Simeon Bamford is completing his Ph.D. thesis at the department of Informatics and Institute of Integrated Micro and Nano Systems, Edinburgh University, Scotland. He works on Neuromorphic Very Large Scale Integrated circuits that process information by mimicking the function of neurons, the type of cells present in brain. In addition he is interested in neural prosthetics and the design of electronics for these complex devices.