UNIVERSITÄT LEIPZIG

Fakultätskolloquium

Tuesday, May 26, 2020, 17:00

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Advances in unconventional computing

Unconventional computing is an interdisciplinary approach combining various fields such as computer science, physics, mathematics, chemistry, electronic engineering, biology, material science and nanotechnology. It aims to exploit principles and mechanisms of information processing in physical, chemical and living systems to develop efficient algorithms, design optimal architectures and manufacture working prototypes for future and emergent computing devices. I will demonstrate computer modelled and experimental laboratory prototypes of computing and sensing devices implemented with cytoskeleton polymers, living plants, fungi and slime mould. Three families of unconventional computing/sensing devices will be considered: spiking of voltage, morphological and collision-based. In computational devices based on spiking activity, data are represented by electrical impulses injected in a system from input electrodes and results are interpreted as combinations of spikes on the output electrodes. In morphological computers, data are presented by configurations of attractants and repellents and results are given by a physical reconfiguration of the living substrate (protoplasmic network, roots, mycelium). In the collision-based computers, data are presented by physical and chemical stimuli of the substrate. Computation is implemented by spikes of electrical activity propagating in the substrate and results of the computation are recorded as spiking activity in dedicated parts of the substrate.

The colloquium will take place via BigBlueBotton.