

Abstract of Presentation

Name Queisser, Gillian	Affiliation University of Frankfurt
URL (if you have your webpage) http://g-csc.de/~gqueisser/	E-mail address Gillian.queisser@gcsc.uni-frankfurt.de
Research interest: Detailed Modeling of Signal Processing in Neurons	
Abstract : <p>The research focus of our group is to understand basic neuronal functioning in the brain by applying advanced computational methodology in the neuroscientific field. We develop computational methods, models and software for cellular and sub-cellular signal processing in nerve cells, e.g. signal processing in axons and calcium coding in the nucleus, based on theories from continuum mechanics.</p> <p>In order to model neurobiological processes in three dimensions and on realistic geometries, we develop software for the reconstruction of neurons and neuronal organelles. With reconstruction and simulation platforms at hand our research group has, for example, been investigating the morphological influence of cell nuclei on calcium regulated transcription processes in hippocampal neurons.</p> <p>In an attempt to link signal processing in small cellular networks to sub-cellular signal processing, we have been furthering the development of software, which makes use of physiological data, for automatic generation of neural networks.</p> <p>These networks can be used within simulation platforms like NEURON but also provide a full three-dimensional representation of the network in order to perform detailed three-dimensional simulations of signal processing on different scales. Since this requires techniques from computer science and in particular grid generation and image processing our third area of research is focussed on pooling efficient image reconstruction methods with grid generators and optimizers and the underlying simulation platform.</p>	