

Steinbuch Centre for Computing of Karlsruhe Institute of Technology cordially invites you to its

Scientific Colloquium

Nature Inspired Computing

Marek Bundzel

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Steinbuch Centre for Computing
FTU Aula
Campus North

Abstract

Computers - the high point of technology. Our omnipresent slaves and sometimes masters. But thousands of years before the first vacuum tube lit up biological computing machines existed that would outmatch our contemporary silicon companions in nearly every aspect. If in doubt just try to build a machine doing what a simple ordinary house fly does. Soon you will realize, that this simple creature processes and integrates large amounts of various sensory data, infers decisions to sustain its life and adapts to the environment. How?

In the talk we will go through some theory and practice of computing methods inspired by the nature. Despite we are slowly becoming capable to build the computing hardware of the desired complexity we often fail to program that hardware to our liking. Partially, that's why we want the hardware to learn by itself. We will see how artificial neural networks are build and used. We will also see how it is possible to find solutions to complex problems by means of simulated evolutionary optimization. And finally, the memory-prediction framework a progressive new theory trying to explain how the mammalian brain works will be presented. The practical examples to be shown include land use categorization using artificial neural networks, evolutionary optimization of a mechanical structure, object identification in sequences of images using a method based on memory-prediction framework and some more.

Marek Bundzel

Marek Bundzel, PhD. is the head of the Center for Applied Cybernetics at the Department of Cybernetics and Artificial Intelligence, Technical University Kosice, Slovakia. His research is oriented on the methods of computational intelligence: artificial neural networks, support vector machines, evolutionary optimization and robotics. Marek Bundzel has spent two years at Waseda University, Tokyo, where he was researching the potential of modeling the brain for the purposes of visual object identification performed on a mobile robot. He enjoys building stuff and dreams about getting funding to build a fleet of autonomous gliders recharging by regenerative soaring.