# Scientific Computing

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# Talk: Parallel Simulation of Large Neuronal Networks on Clusters of Multiprocessor Computers

**On Monday, January 21, 13:00-13:45, Dr. Hans Ekkehard Plesser from will give a lecture:     "Parallel Simulation of Large Neuronal Networks on Clusters of Multiprocessor Computers", in Bakrommet at Simula.**

Total number of participants: 15
Number of different  nationalities represented: 3
Total number of speakers: 1
Total number of talks: 1

## Abstract

To understand the principles of information processing in the brain, we depend on models with more than 105 neurons and 109 connections.
These networks can be described as graphs of threshold elements that exchange point events over their connections.

From the computer science perspective, the key challenges are to represent the connections succinctly; to transmit events and update neuron states efficiently; and to provide a comfortable user interface.
I will present the neural simulation tool NEST, a neuronal network simulator which addresses these requirements. To simulate very large networks with acceptable time and memory requirements, NEST uses a hybrid strategy, combining distributed simulation across cluster nodes
(MPI) with thread-based simulation on each computer.

In his talk, he will introduce the main design principles behind the NEST simulator, present benchmark results identifying advantages of their approach and discuss remaining bottlenecks.

Literature about NEST:
M.-O. Gewaltig & M. Diesmann. NEST. Scholarpedia 2(4):1430.
www.scholarpedia.org/article/Nest

H. E. Plesser, J. M. Eppler, A. Morrison, M. Diesmann, and M.-O.
Gewaltig. Efficient parallel simulation of large-scale neuronal networks on clusters of multiprocessor computers. In A.-M. Kermarrec, L. Bougé, and T. Priol (Eds): Euro-Par 2007, LNCS 4641:672-681, 2007.
arken.umb.no/~plesser/publications/Ples_2007_672.pdf

Dr. Plesser is an associate professor at the Dept. of Mathematical Sciences and Technology at the Norwegian University of Life Sciences (Ås).
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| **What** | |
| **When** | Jan 21, 2008 from 01:00 PM to 01:45 PM |
| **Where** | Bakrommet @ Simula |
| **Contact Name** | Hans Petter Langtangen |
| **Add event to calendar** | vCal  iCal |