

University of Southern California

BIOMEDICAL SIMULATIONS RESOURCE (BMSR)

Short Course: Modeling Nonlinear Synaptic Dynamics using EONS

Organized by Jean-Marie C. Bouteiller., Ph.D. - Theodore W. Berger, Ph.D.

Short Course Program

Date

June 18, 2007 (Monday)

8:30–9:00 am

Continental Breakfast

9:00–10:30 am

*Motivation behind the creation of EONS -
Overall description*

Location

University of Southern California (USC)
Department of Biomedical Engineering
1041 Downey Way
DRB bldg.
Los Angeles, California 90089-1111
Telephone: (213) 740-7234

10:45–12:30 pm

EONS – Hands-on, Guided Exercises

12:30–1:30 pm

Lunch

1:30–2:30 pm

*Presentations by Invited Speakers -
Jose Ambros-Ingerson, Ph.D.
Modeling the electrophysiology of CA1 pyramidal
cells*

Victor Matveev, Ph.D.

*Mechanisms of short-term synaptic facilitation:
computational modeling using CalC*

Robert E. Hampson, Ph.D.

Neural Representation of Working Memory

2:30–3:30 pm

The Future of EONS, Perspectives

3:30–3:45 pm

Break

3:45–5:00 pm

*Round Table: Extensions, Future and
Applications*

EONS

Chemical synapses, although representing the smallest unit of communication between two neurons in the nervous system constitute a complex ensemble of mechanisms. Understanding these mechanisms and the way synaptic transmission occurs is critical for our comprehension of CNS functions in general and learning and memory in particular. EONS is an acronym for Elementary Objects of the Nervous System. EONS is a modeling platform that focuses on describing the dynamics that occur at one glutamatergic synapse. It allows neuroscientists throughout the world to study qualitatively and quantitatively the relative contributions of each and every elements that comprise a synapse, the interactions between these components and their subcellular distribution, as well as the influence of synaptic geometry (presynaptic terminal, cleft and postsynaptic density). For further details of the modeling platform, a more thorough description is available at: <http://eons.no-ip.info>.

About the Short Course

This short course will focus mainly on the following:

1. Provide an introduction to EONS: what is EONS? Why using EONS, and how?
2. Provide some insight on the current features of the synaptic modeling platform (algorithms and numerical methods in use, synaptic elements currently modeled, scientific questions being addressed, etc...).
3. In what direction should future developments evolve to better address the needs of the scientific community, for research as well as education (addition of synaptic elements and pathways, interaction with other platforms such as Neuron, utilization of a standardized modeling language - CellML?, etc...).

*The meeting will include hands-on computer sessions,
please bring a laptop with a version of Java v.1.5+*

**For additional information please contact
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or via e-mail
marcos@bmsr.usc.edu**

About the BMSR

The Biomedical Simulations Resource (BMSR) is dedicated to advancing the state of the art in biomedical modeling and simulation through its four innovative core research projects, 14 nationwide collaborative projects, and through software development, training, and dissemination activities aimed at the biomedical research community at large. Through these activities, the BMSR serves as a catalyst of discovery for biomedical investigators worldwide.