

BIOMEDICAL SIMULATIONS RESOURCE (BMSR)

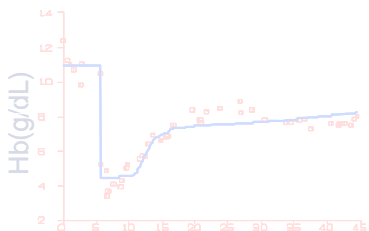
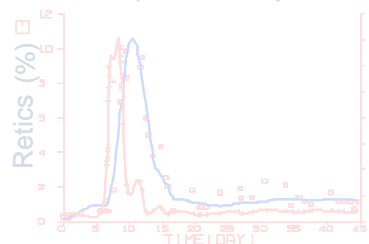


Workshop on

*Advanced Methods of
Physiological
System Modeling*

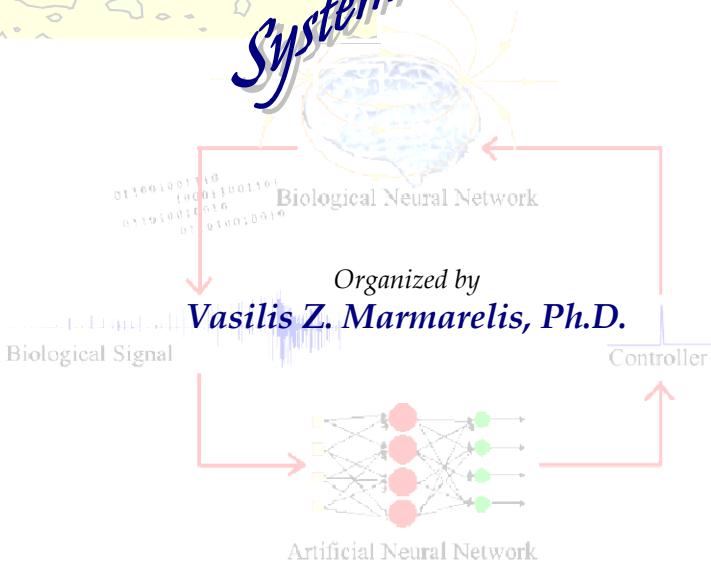
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Sheep 3, Phlebotomy i



Time

Workshop on
Advanced Methods of
Physiological
System Modeling



Organized by
Vasilis Z. Marmarelis, Ph.D.

Supported by

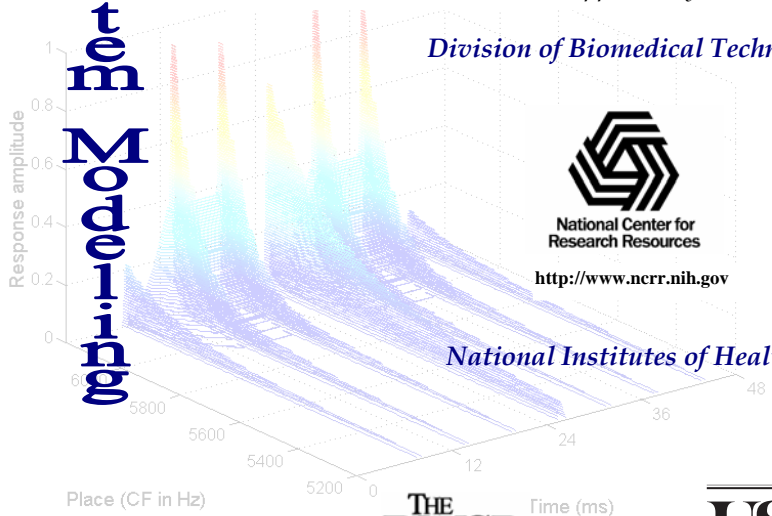
Division of Biomedical Technology



National Center for Research Resources

<http://www.ncrr.nih.gov>

National Institutes of Health



Place (CF in Hz)

Time (ms)

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Saturday
April 20, 2002

THE BMSR
<http://bmsr.usc.edu>

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PREAMBLE

For many years, the “reductionist” view has dominated research in biological sciences, inadvertently relegating the “integrative” or “systems” view to the status of a “poor relative”.

Regardless of the indisputable value of molecular and cellular biology (practiced in a reductionist manner) many thoughtful observers have felt that the value of systems biology/physiology is equally indisputable, and the two approaches must be equally supported and jointly nurtured. This balanced approach is the only way scientific progress can be secured in the long run.

There are signs of resurgence of interest in the systems view of biology/physiology, as the reductionist view approaches its natural limits of autonomous development. The scientific community begins to realize (again!) that understanding the components alone is not sufficient -- the functional properties of the integrated whole (system) is the means for achieving the goal of improved health care.

At the threshold of this new era of systems physiology, we have a critical role to play and a responsibility to meet the new challenges: advanced methods of analysis/modeling that treat the *real* problem under natural operating conditions (multi-variate, nonlinear, dynamic, nonstationary, stochastic, broadband, closed-loop).

We must also endeavor to collect more and better data for this purpose, as well as provide the requisite interpretation and means of utilization that allow rapid and effective transition to clinical practice.

The BMSR sponsors this Workshop as part of its continuing efforts to promote interaction among leading experts and facilitate the advent of this new era.

Vasilis Z. Marmarelis

April 2002

Workshop Schedule

Saturday, April 20, 2002

8:00 *Registration & Continental Breakfast*

8:45 *Introductory Remarks*

Vasilis Z. Marmarelis

University of Southern California

9:00 Signal Processing by the Gerbil Cochlea: What We Can See in Wiener Kernels

Edwin R. Lewis

University of California, Berkeley

9:20 Searching for Connections in a Mammalian Sensory Pathway
by Nonlinear Analysis of Spike Trains

Andrew S. French

Dalhousie University, Halifax

9:40 Pharmacodynamic Analysis of Erythropoietin

Peter Veng-Pedersen

University of Iowa

10:00 *Break*

10:15 Separation of Spiky Transient Activity in EEG/MEG Data
Using Multiresolution and Morphological Analysis

Robert J. Scwabassi

University of Pittsburgh

10:35 Population Coding in Hippocampal Neurons: The Necessity of Transfer
Functions for Correct Short-Term Memory Performance

Robert E. Hampson

Wake Forest University

10:55 Parametric and Nonparametric Models of Presynaptic Nonlinearities
of Hippocampal Pyramidal Neurons

Theodore W. Berger

University of Southern California

11:15 *Break*

11:30 Detection and Control of Epileptic Seizures Using Artificial Neural Networks

Berj L. Bardakjian

University of Toronto

11:50 Localizing Brain Activity in Space and Time: Combining VEP and fMRI

Stanley A. Klein

University of California, Berkeley

12:10 A Bayesian Framework for Sensory Adaptation

Norberto M. Grzywacz

University of Southern California

12:30 *Lunch*

2:30 Independent or Correlated Convergent Presynaptic Trains
Embody Poisson or Cluster Point Processes

Jose P. Segundo

University of California, Los Angeles

2:50 Nonlinear Modeling and Identification of Reflex Contributions to Joint Stiffness

Robert E. Kearney

McGill University

3:10 Separable Least Squares: A New Approach to the Identification
of Nonlinear Block Structured Models

David T. Westwick

University of Calgary

3:30 *Break*

3:45 Synthesizing Response Sequences from the Kernel Series of Multi-Input Systems

Erich E. Sutter

Smith-Kettlewell Eye Research Institute

4:05 Applications of Parallel-Cascade System Identification

Edward D. Lipson

Syracuse University

4:25 Multi-Variate Nonlinear Dynamic Modeling of Closed-Loop Physiological Systems

Vasilis Z. Marmarelis

University of Southern California

4:45 *Discussion*

6:00 *Reception*

University of Southern California
Biomedical Simulations Resource (BMSR)

Workshop on

**ADVANCED METHODS OF
PHYSIOLOGICAL SYSTEM MODELING**

Saturday, April 20, 2002
Marina Beach Marriott
Marina del Rey, California

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