

BIOMEDICAL SIMULATIONS RESOURCE  
UNIVERSITY OF SOUTHERN CALIFORNIA

# PROGRAM

## 3rd Workshop on Advanced Methods of Physiological System Modeling

Sponsored by  
DIVISION OF RESEARCH RESOURCES  
NATIONAL INSTITUTES OF HEALTH

May 27-28, 1988

Marina International Hotel  
4200 Admiralty Way  
Marina del Rey, California  
(213) 301-2000

Chairman and Organizer:  
Vasilis Z. Marmarelis  
(213) 743-3648

Day 1

Friday, May 27, 1988

**9:00 – 12:00 Session 1.1: Nonlinear Methods and Applications I**

- 9:00 Vasilis Z. Marmarelis, University of Southern California  
“Nonlinear Differential Equations and Volterra-Wiener Expansions”
- 9:20 H.H. Sun, Drexel University  
“An Extension of Korenberg-Billings Method of Nonlinear System Identification”
- 9:40 S. Klein, University of California, Berkeley  
“Natural Units and Shape of Kernels for Systems that Adapt ”
- 10:00 M.J. Korenberg, Queen’s University (Canada)  
“Efficient Computation of 2nd and Higher Order Kernels”
- 10:20 L. Paarmann, Drexel University  
“ARMA Identification Via an Orthogonal Search Procedure”
- 10:40 H. King, University of Colorado, Denver  
“Analysis of Simulated Neural Networks Using Wiener Kernels”
- 11:00 W. Larimore, Business & Technological Systems, Inc.  
“Nonlinear System Identification Using Affine Innovations Models”
- 11:20 E.E. Sutter, Smith-Kettlewell Institute for Visual Sciences  
“Nonstochastic Analysis Techniques of Nonlinear Systems”
- 11:40 Panel Discussion: “Use of High-Order Statistics in System Identification”  
J.M. Mendel, University of Southern California  
E. Lipson, Syracuse University  
J.D. Victor, Cornell University Medical College

**12:00 – 1:15 Lunch**

**1:15 – 3:15 Session 1.2: Neuronal Systems**

- 1:15 A.S. French, University of Alberta (Canada)  
“Nonlinear Analysis of Sensory Transduction and Encoding”
- 1:35 J.P. Segundo, University of California, Los Angeles  
“Locking and Intermittency in a Mechano-Receptor”

Day 1

Friday, May 27, 1988

**1:15 – 3:15 Session 1.2: Neuronal Systems (continued)**

- 1:55 T.W. Berger, University of Pittsburgh  
“A Comparison of Nonlinear System Properties of the in vivo and in vitro Hippocampus”
- 2:15 R.J. Scwabassi, University of Pittsburgh  
“Cross-Modulatory Characterizations of Sensory Interactions in the Human CNS”
- 2:35 D. Krieger, University of Pittsburgh  
“Nonlinearities in Scalp-Recorded EEG During Cognitive Task Performance”
- 2:55 Panel Discussion: “The Role of Models in Neuroscience”  
A.R. Moller, University of Pittsburgh  
D.P. O’Leary, University of Southern California  
L.D. Partridge, University of Tennessee

**3:15 – 5:15 Session 1.3: Visual System**

- 3:15 K.I. Naka and H.M. Sakai, National Institute for Basic Biology (Japan)  
“Neuronal Network in the Catfish Retina”
- 3:35 R.L. Chappell, Hunter College, City University  
“Ambient Influence on Retinal Dynamics in the Outer Plexiform Layer”
- 3:55 E.H. Adelson, Massachusetts Institute of Technology  
“Spatiotemporal Energy Model for Motion Perception”
- 4:15 R.C. Emerson, University of Rochester  
“Identification of Intensive Nonlinearities in Cascade Models of Visual Cortex,  
and Its Relation to Cell Classifications”
- 4:35 J. Teeters, University of Southern California  
“A Simulation Model of the Vertebrate Retina”
- 4:55 Panel Discussion: “The Role of Models in Visual Neuroscience”  
M.C. Citron, University of Southern California  
F. Krause, Philipps Universität (W. Germany)  
E.E. Sutter, Smith-Kettlewell Institute for Visual Sciences  
J.D. Victor, Cornell University Medical College

**5:15 – 7:00 Reception**

Day 2

Saturday, May 28, 1988

**9:00 – 12:00 Session 2.1: Nonlinear Methods and Applications II**

- 9:00 B. Saltzberg, University of Texas Medical School  
"Filtering for Chaos"
- 9:20 F.E. Yates, University of California, Los Angeles  
"Correlation Dimension as Measure of Cardiac 'State' in Holter Monitor 24th Heart Rate Records"
- 9:40 G. Mayer-Kress, Los Alamos National Laboratory  
"Time Evolution of Dimensional Complexity Measures as a New Way to Quantify the Dynamics of Erratic Signals"
- 10:00 L Benton, University of California, Los Angeles with G. Mayer-Kress & F.E. Yates  
"The Dimensionality of the Human Electrocardiogram"
- 10:20 J.D. Victor, Cornell University Medical College  
"Geometry of System Analysis: Fractal Dimension and Integration Formulae"
- 10:40 P.L. Nunez, Tulane University  
"Generation of Human Electroencephalographic Rhythms by a Combination of Long and Short Range Neocortical Interactions"
- 11:00 L.S. Liebovitch, Columbia University  
"Properties and Analysis of Self-Similar Data"
- 11:20 Panel Discussion: "The Role of Chaos in System Theory"  
D.L. Elliott, National Science Foundation  
F.E. Yates, University of California, Los Angeles

**12:00 – 1:15 Lunch**

Day 2

Saturday, May 28, 1988

**1:15 – 2:45 Colloquium: Mathematical Concepts of CNS Function**

*Organizer and Moderator: L. Stark, University of California, Berkeley*  
*Panel (in alphabetical order):*

- M. Arbib      University of Southern California  
                  “The History of Brain Theory Computers: An Interactive Development”
- B. Hannaford   Jet Propulsion Laboratory  
                  “Control Models for Biological Behavior”
- J. Keeler      Stanford University  
                  “Modern Network Theory”
- S. Lehman      University of California, Berkeley  
                  “Mathematical Approaches to Brain Function”
- G.P. Moore     University of Southern California  
                  “The Intellectual Explosion of Cybernetics 30 Years Ago”
- L. Stark        University of California, Berkeley  
                  “The Shannon-McCulloch Meeting”

**3:00 – 5:00 Session 2.2: Biomedical Modeling, Simulation and Control**

- 3:00 A.V. Sebald, University of California, San Diego  
      “Intelligent Closed Loop Controls for Drug Infusion in the Operating Room”
- 3:20 F. Krause & F. Gonzalez, Philipps Universität ( W. Germany)  
      “Characterization of Visual Units by Receptive Field Cinematograms”
- 3:40 E.B. Rypins, University of California, Irvine  
      “Computer Modeling of Splanchnic Hemodynamics Using the Simulation Control Program (SCoP)”
- 4:00 D. Hary, University of Southern California  
      “Causality in Time Prediction Behavior”
- 4:20 C.K. Lin, University of Southern California  
      “Behavioral Simulation of Cardiovascular System Responses During Circulatory Assist”
- 4:40 Panel Discussion: “Biomedical Modeling, Simulation and Control”  
      W.B. Blesser, Polytechnic University, New York  
      A.V. Sebald, University of California, San Diego  
      L. Stark, University of California, Berkeley

**5:00 – 7:00 Reception**

**3rd Workshop on  
Advanced Methods of Physiological System Modeling  
DIRECTORY**

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