

BIOMEDICAL SIMULATIONS RESOURCE  
UNIVERSITY OF SOUTHERN CALIFORNIA

# PROGRAM

## 5th Short Course on Nonlinear Methods of Physiological System Modeling

Sponsored by  
DIVISION OF RESEARCH RESOURCES  
NATIONAL INSTITUTES OF HEALTH

March 1, 1990

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

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

## Short Course

Thursday, March 1, 1990

- 9:00      “Volterra–Wiener Modeling of Physiological Systems: An Overview”  
V.Z. Marmarelis, University of Southern California
- 10:00     “Exact Orthogonalization Techniques for Nonlinear System Identification  
and Time–Series Analysis”  
M. Korenberg, Queen’s University (Canada)
- 11:00     “Volterra–Wiener Analysis of Sensory Systems”  
A. French, University of Alberta (Canada)
- 12:00     Lunch Break
- 2:00      “Identification and Modeling of Nonlinear Systems Using  
Canonical Variate Analysis”  
W. Larimore, Computational Engineering, Inc.
- 3:00      “Relation Between Parametric and Nonparametric Models of Nonlinear  
Systems”  
V.Z. Marmarelis, University of Southern California
- 4:00      Open Discussion

Day 1

Friday, March 2, 1990

- 9:00 "Wiener Analysis of Nonlinear Feedback in Sensory Systems"  
V.Z. Marmarelis, University of Southern California
- 9:30 "Advances in Exact Orthogonalization Approaches for Nonlinear System  
Identification and Time-Series Analysis"  
M.J. Korenberg, Queen's University (Canada)
- 10:00 "Hypothesis Testing and Instantaneous Characterization of Time-Varying  
Non-Linear Systems"  
D. Krieger, T. Berger, D. Weisz, P. Jasiukaitis and R.J. Sclabassi,  
University of Pittsburgh
- 10:30 Coffee Break
- 10:45 "Power Density and the Need for Sparse Stimulation"  
S.A. Klein, University of California, Berkeley
- 11:15 "Structural Classification of Multi-Input Biological Nonlinear Systems"  
H.W. Chen, L.D. Jacobson, J.P. Gaska, and D.A. Pollen,  
University of Massachusetts Medical School
- 11:45 Lunch Break
- 1:15 "Some Fundamental Problems in the Analysis of Complex Biological Systems"  
E.E. Sutter, Smith-Kettlewell Eye Research Institute
- 1:45 "*M*-Pulse Sequences in the Study of Nonlinearities in Brainstem Auditory  
Evoked Responses"  
Y. Shi and K.E. Hecox, University of Wisconsin-Madison
- 2:15 "Nonlinear Neural Network Models of the Vestibulo-Ocular Reflex"  
T.J. Anastasio, University of Southern California
- 2:45 Coffee Break
- 3:00 "Chaotic Dynamics of the Electrical Activity in the Stomach"  
B.L. Bardakjian, University of Toronto (Canada)
- 3:30 "Are Neuronal Functions Chaotic?"  
L.D. Partridge, University of Tennessee
- 4:00 Open Discussion

Day 2

Saturday, March 3, 1990

- 9:00 "Contribution of Inhibitory Interneurons to Nonlinear Response Characteristics of the Hippocampal Dentate Gyrus"  
T.W. Berger, T.P. Harty, T. Blanpied, R.J. Scwabassi and G. Barrionuevo, University of Pittsburgh
- 9:30 "Cognitive ERPs Have Nonlinear Components"  
P.A. Jasiukaitis, D.N. Krieger and R.J. Scwabassi, University of Pittsburgh
- 10:00 "Half-Wave and Full-Wave Rectifying Nonlinearities in Cascade Models of Simple and Complex Cortical Cells"  
R.C. Emerson, University of Rochester; M.J. Korenberg, Queen's University (Canada); and M.C. Citron, Children's Hospital of Los Angeles
- 10:30 Coffee Break
- 10:45 "Study of Chromatic Processing in Vertebrate Retina: Another Physiological Application of Wiener Analysis"  
H.M. Sakai, New York University
- 11:15 "Nonlinear Interactions Between Photons in the Locust Eye"  
A. Pece and A. French, University of Alberta (Canada)
- 11:45 Lunch Break
- 1:15 "Response Dynamics of Ganglion Cells in the Rabbit Retina"  
S. Mangel, University of Alabama; H. Sakai and K.-I. Naka, New York University Medical Center
- 1:45 "Adaptation of Directional Response Characteristics of a Class of Shunting Inhibitory Neural Networks"  
A. Bouzerdoum and R.B. Pinter, University of Washington
- 2:15 "Identification and Filtering of Nonlinear Systems Using Canonical Variate Analysis"  
W.E. Larimore, Computational Engineering, Inc.
- 2:45 Coffee Break
- 3:00 "Modeling the Velocity Estimation Mechanism in the Retina"  
S.H. Courellis and V.Z. Marmarelis, University of Southern California
- 3:30 Open Discussion
- 4:30-6:30 Reception