

BIOMEDICAL SIMULATIONS RESOURCE  
UNIVERSITY OF SOUTHERN CALIFORNIA

# PROGRAM

## 2nd Workshop on Advanced Methods of Physiological System Modeling

Sponsored by  
DIVISION OF RESEARCH RESOURCES  
NATIONAL INSTITUTES OF HEALTH

May 22-23, 1987  
Marina International Hotel  
4200 Admiralty Way  
Marina del Rey, California  
(213) 301-2000

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

### Preamble

The emphasis of the workshop is on group discussion of topics of current interest in the area of nonlinear modeling of physiological function. Presentations in each session will be brief and focused. The panels will lead the discussion on specific issues that will be compiled and distributed before the meeting starts.

**Day 1**  
Friday, May 22

9:00 **Session 1.1: Volterra-Wiener modeling methods**

*Brief presentations:*

- V. Marmarelis: "The Wiener-Bose model revisited"  
M. Korenberg: "Exact orthogonalization methods for kernel estimation"  
S. Klein: "Iterative kernel estimation and "redundant" orthogonalization"

*Discussion Panel: (in alphabetical order)*

- I. Hunter, McGill University  
S. Klein, University of Houston  
M. Korenberg, Queen's University  
V. Marmarelis, University of Southern California  
J. Victor, Cornell University, Medical College

10:45 **Session 1.2: Applications of Volterra-Wiener methods (I)**

*Brief Presentations:*

- R. Sclabassi: "Nonparametric and parametric models of sensory data"  
J. Victor: "Nonlinear processes in visual texture processing"  
H. Sakai: "The Wiener and Korenberg models in the catfish retina"

*Discussion Panel: (in alphabetical order)*

- A. French, University of Alberta  
A. Moller, University of Pittsburgh  
H. Sakai, National Institute for Basic Biology (Japan)  
R. Sclabassi, University of Pittsburgh  
J. Victor, Cornell University, Medical College

13:30 **Session 1.3: Applications of Volterra-Wiener methods (II)**

*Brief Presentations:*

- T. Berger: "Wiener analysis of hippocampal network changes"  
R. Kearney & I. Hunter: "Nonlinear and nonstationary models of muscle mechanics"  
E. Lipson: "Modeling of phycomyces light-growth response"

*Discussion Panel: (in alphabetical order)*

- T. Berger, University of Pittsburgh  
I. Hunter, McGill University  
R. Kearney, McGill University  
E. Lipson, Syracuse University  
R. Sclabassi, University of Pittsburgh

15:15 **Session 1.4: Applications of Volterra-Wiener methods (III)**

*Brief Presentations:*

- R. Pinter: "Kernel adaptation to mean luminance and velocity of stimuli"  
H. Lesser: "Wiener predictions of the bat inferior colliculus responses"

*Discussion Panel: (in alphabetical order)*

- R. Chappel, Hunter College  
M. Citron, University of Southern California  
R. Emerson, University of Rochester  
W. O'Neil, University of Rochester  
R. Pinter, University of Washington

**Day 2**  
**Saturday, May 23**

**9:00 Session 2.1: Chaos, fractals and self-organizing systems**

*Brief Presentations:*

- W. Freeman: "Chaotic behavior and physiological system function"  
E. Yates: "Topological methods of physiological system modeling"  
L. Liebovitch: "Fractal analysis of ion channel protein switching"

*Discussion Panel: (in alphabetical order)*

- W. Freeman, University of California, Berkeley  
B. Hannaford, Jet Propulsion Laboratory  
L. Liebovitch, Columbia University  
G. Mayer-Kress, University of California, Los Angeles  
B. Onaral, Drexel University  
T. Poston, University of California, Los Angeles  
E. Yates, University of California, Los Angeles

**11:00 Session 2.2: Motor control: Models and expert systems**

*Brief Presentations:*

- G. Bekey: "Expert systems for diagnoses of human gait"  
B. Hannaford & L. Stark: "Nonlinear dynamics of muscle contraction"  
D. Hary: "Models of timing behavior in humans"

*Discussion Panel: (in alphabetical order)*

- G. Bekey, University of Southern California  
I. Hunter, McGill University  
R. Kearney, McGill University  
L. Partridge, University of Tennessee  
L. Stark, University of California, Berkeley

**13:30 Session 2.3: Parametric modeling methods in physiology**

*Brief Presentations:*

- W. Larimore: "State-space modeling of nonlinear systems"  
D. Krieger: "Correspondences between Wiener and parametric models"

*Discussion Panel: (in alphabetical order)*

- C. Greco, Medical College of Virginia  
M. Korenberg, Queen's University  
D. Krieger, University of Pittsburgh  
W. Larimore, Business & Technological Systems, Inc.  
R. LeBlanc, Université de Montréal  
D. O'Leary, University of Southern California

**15:30 Session 2.4: Data processing and simulation software**

*Brief Presentations:*

- I. Hunter & R. Kearney: "NEXUS: a computer language for physiological systems"  
S. Berry: "Biomedical data analysis and management software system"  
B. Drakulic: "Intelligent hardware for biomedical data acquisition"  
V. Marmarelis: "LYSIS: an interactive simulation software package"

*Discussion Panel: (in alphabetical order)*

- S. Berry, University of California, Los Angeles  
B. Drakulic, University of California, Los Angeles  
I. Hunter, McGill University  
R. Kearney, McGill University

**2nd Workshop on  
Advanced Methods of Physiological System Modeling**

**DIRECTORY**

**PANELISTS AND SPEAKERS**

- |                        |  |
|------------------------|--|
| Prof. George Bekey     | Univ. of Southern California<br>Dept. of Computer Science<br>Los Angeles, CA 90089-0782  |
| Prof. Ted Berger       | University of Pittsburgh<br>Neurosciences Center<br>465 Crawford Hall<br>Pittsburgh, PA 15260  |
| Prof. Steve Berry      | Crump Institute<br>University of California, Los Angeles<br>405 Hilgard Avenue<br>Los Angeles, CA 90024-1654   |
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| Prof. Carl Greco       | Virginia Commonwealth University<br>Medical College<br>Biomedical Engineering Division<br>School of Basic Sciences, Box 694<br>Richmond, VA 23298-0694 |

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