

EMERSON CENTER LECTURESHIP AWARD SYMPOSIUM

Computational and Mathematical Modeling in Biological Sciences

Cherry L. Emerson Center for Scientific Computation, Emory University



Dr. Cherry L. Emerson

Wednesday, May 4, 2005

Location: 360 Atwood Hall, Emory University

AWARD WINNER & KEYNOTE SPEAKER:



George Oster

*Professor of Cell & Developmental Biology and of Environmental Science, Policy & Management
Department of Molecular & Cellular Biology, University of California, Berkeley*

Myxobacteria are rod-shaped bacteria that 'glide' over surfaces. They hunt in large swarms by secreting enzymes that digest much faster moving bacteria. When food is scarce they aggregate into fruiting bodies containing the spores that will seed the next generation. During this aggregation they pass through several developmental stages characterized by elaborate collective behaviors, including spiral wave patterns, and culminating in multi-armed fruiting bodies. Their collective behavior is a consequence of an internal cell 'clock' and an intercellular communication system that depends only on direct contact; no diffusible morphogens have been detected. Some of the patterns they form are unlike any other in biology, chemistry or physics. Investigating these humble organisms reveals many puzzles whose solution sheds light on

similar phenomena in the cells of higher organisms. I will discuss how mathematical modeling has produced answers to several mysteries: How do these cells propel themselves? How do they communicate with each other? And how does their internal 'clock' steer their collective morphogenetic patterns?

INVITED SPEAKERS:



Mark Borodovsky
*Schools of Biology &
Biomedical Engineering,
Georgia Tech., Atlanta*



H. G. E. Hentschel
*Department of Physics,
Emory University,
Atlanta*



Bruce R. Levin
*Department of Biology,
Emory University,
Atlanta*



James Snyder
*Department of
Chemistry, Emory
University, Atlanta*

SCHEDULE OF EVENTS:

9:30 - 12:00

POSTER PRESENTATIONS

12:00 - 1:00

LUNCH (and tour of Emory and Emerson Center)

1:00 - 1:15

OPENING CEREMONY & AWARD PRESENTATION

1:15 - 2:15

Prof. George Oster (UC-Berkeley, Biology), *Myxobacteria Motors and Morphogenesis*

2:15 - 3:10

Prof. Bruce Levin (Emory, Biology), *The Role of Mathematical & Lesser Models in Experimental Population & Evolutionary Biology*

3:10 - 3:30

COFFEE BREAK

3:30 - 4:25

Prof. Mark Borodovsky (Georgia Tech, Biology), *Modeling & Recognition of Functionally Important Regions in Biomolecular Sequences*

4:25 - 5:20

Prof. George Hentschel (Emory, Physics), *The Morphogenesis of Skeletal Pattern Formation in the Vertebrate Limb*

5:20 - 6:15

Dr. James Snyder (Emory, Chemistry), *Cytoskeletal Proteins, Molecular Motors & the Action of Small Molecules*

6:15 - 6:25

Closing

7:00 - 8:30

DINNER (by invitation only)

REGISTRATION AND CONTACT INFORMATION:

Email: clec@euch4e.chem.emory.edu

<http://www.emerson.emory.edu/conferences/index.html>

Abstracts of invited talks are available at the website.

Registration is free, but you must register to attend.

The Emerson Center Lectureship Award was established in the fall of 2003 to recognize distinguished achievements by scientists in computational sciences and to facilitate collaboration among different disciplines of computational sciences. On the board of the Emerson Center Lectureship Award Selection Committee are Professors Kurt Warncke (Physics, chair), Rustom Antia (Biology), Michele Benzi (Math & Computer Science), Justin Gallivan (Chemistry), Keiji Morokuma (Emerson Center), and Keith Wilkinson (Biochemistry) of Emory University. Dr. Jamal Musaev (Emerson Center) is appointed as the Lectureship Coordinator.



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