

Engineering Principles in Biological Systems

Session 1 INTRODUCTION

SUNDAY 12/3/2006, 7:30 PM

P. Mitra

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
1	Smolke	Design principles in biological systems—Examining the regulatory architecture in natural and engineered systems	25
2	Savageau	Navigating system design space—Boundaries and tolerances	25
3	Holmes	On modeling legged locomotion	25
4	Doyle	Robust and evolvable network architecture	25

Session 2 FEEDBACK, DYNAMICS AND CONTROL I

MONDAY 12/4/2006, 9:00 AM

B. Mishra

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
	Murray	No Title	40
5	El-Samad	Unraveling biological design principles in cellular networks using engineering methods	20
6	Massaquoi	Horizontally and hierarchically distributed feedback control of human balance and locomotion	20
7	Rohrseitz	Visual groundspeed control in free-flying fruit flies	20
8	Skotheim	Budding yeast Start—Using single cell microscopy, genetic analysis and quantitative modeling to infer nonlinear regulatory dynamics	20
9	Yanai	Molecular mechanisms that underlie the robustness of a biological network	20
10	Vinnicombe	Fundamental limitations on noise reduction in the cell	20

Session 3 SYNTHETIC BIOLOGY, BIOMEDICAL APPLICATIONS

MONDAY 12/4/2006, 2:00 PM

H. El-Samad

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
11	Voigt	Engineering the type III secretion system to export heterologous proteins	20
12	Csete	Stem cells and pain	20
13	Schiff	Spatiotemporal organization of cortical dynamics	20

Session 4 POSTER SESSION

MONDAY 12/4/2006, 3:30 PM

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
14	Aggarwal	The Probabilistically-Switch-Action-on-Failure learning automation and prisoner's dilemma	
15	Ahammad	Tools for characterization and classification of brain activity via magnetoencephalography	
16	Ray	Oscillatory transcriptional networks in sporulating yeast	

17	Meir	Reinforcement learning, spike time dependent plasticity and the BCM rule
18	Biron	A (first) mechanistic insight into the experience dependent plasticity in the thermotactic behavior of <i>C. elegans</i>
19	Brandt	Controlling the phase in a neuronal feedback loop through asymmetric temporal delays
20	Chandrasekaran	Coherence in auditory cortical activity is modulated by face/voice integration in rhesus monkeys
21	Chin	Quantitative study of the dynamics of gene regulation in metabolic pathways using high temporal resolution flow cytometry
22	Dempster	Crosstalk susceptibility and module properties in the yeast transcriptional regulatory network
23	Di Talia	Cell size control and variability in budding yeast cell cycle
24	Dubin-Thaler	Cellmap (cell motility analysis platform) reveals a limited number of distinct, dynamical states of the cytoskeleton found in a range of cell types and species
25	Dubljevic	Spatiotemporal control of cardiac alternans
26	Dunlop	A multi-model approach to identification of biosynthetic pathways
27	Feigel	Evolution of cooperation as a consequence of environmental fluctuations
28	Feng	Closed-loop optimal identification of nonlinear bionetworks
29	Gjuvslund	Phenotypic penetrance of mutations in homeostatic networks is dramatically reduced in the presence of nonlinear interactions
30	Hardy	Visualization of biological systems regulatory dynamics
31	Kato	Comparative integromics on developmental signaling pathways
32	Kelsic	An engineered modular RNA-based translational negative feedback system for tunable low variance protein expression in <i>E. coli</i>
33	Kepecs	Neural representation of uncertainty and category learning in rats
34	Koder	De novo engineering of O ₂ capture and electron transfer in a synthetic heme protein
35	Kuriscak	Gating of neuronal signal in branched nerve fibers
36	Pnevmatikakis	A stochastic model for olfactory transduction
37	Nanda	How chirality affects foldability of proteins—Implications for de novo design
38	Oshida	Traffic efficiency of scale-free networks in biological systems
39	Saar	The dynamics of rhythm development in the zebra finch song
40	Sornborger	The evolution of fidelity in sensory systems
41	Srinivasan	Structure of target position representation in dorsal premotor cortex (PMD) before reaching movements
42	Thomas	Thalamocortical synchronization organized around task-related behavioral events
43	Meir	Control theory predicts complex patterns of neural activity observed in the primary motor cortex

44	Valente	A comparative analysis of memory architectures—Digital computers and brains
45	Vatolina	Cloning and comparative analysis of interbands of <i>D. melanogaster</i> polytene chromosomes
46	Vidne	Predictive coding in fly vision
47	Wang	Robust PI regulation control in metabolic pathway
48	Waydo	Explicit object representation by sparse neural codes—A computational model
49	Widmaier	An engineered secretion system for producing heterologous proteins
50	Wilson	Feedback control of single biological polymers in a nanopore
51	Wu	Robust filtering circuit design for gene networks under intrinsic and extrinsic stochastic molecular noises
52	Xiong	Significantly different dynamic behaviors of biological networks between normal and abnormal cells in response to perturbation of environmental stressors and drugs
53	Papatsenko	Quantitative models describing transcriptional responses of dorsal target genes

Session 5 FEEDBACK, DYNAMICS AND CONTROL II

MONDAY 12/4/2006, 7:30 PM

H. Breiter

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
54	Sontag	A qualitative/quantitative view of biomolecular networks	20
55	Abate	Probabilistic safety and optimal control for survival analysis of <i>B. subtilis</i>	20
56	Wang	Integral feedback control in neurons and neural circuits	20
57	Richmond	Behavioral, physiological, genetic and modeling experiments investigating motivation and reward expectancy	20
58	Solms	The ghost in the machine	25
59	Pfaff	Reverse engineering the lordosis behavior's neural circuit	25

Session 6 LEARNING, SYSTEM IDENTIFICATION, PERCEPTION

TUESDAY 12/5/2006, 9:00 AM

R. Murray

<u>#</u>	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
60	Niyogi	Semi-supervised learning	40
61	Murray	System identification in human visual psychophysics	20
62	Batt	Robustness analysis and tuning of synthetic gene networks with parameter uncertainties	20
63	Lazar	Recovery of stimuli encoded with spiking neuron models	20
64	Policriti	A constraint-based approach to stochastic dynamics of biological systems	20
65	Purves	Perception as probability—Why we see what we do	20

Session 7 EVOLUTION, EVolvABILITY

TUESDAY 12/5/2006, 2:00 PM

L. Carporale

#	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
66	Kirschner	Facilitated variation in evolution	40
67	Bayer	Network motifs as adaptations for robustness	20
68	Poyatos	Autogenous and nonautogenous control of response in a genetic network	20
69	Buchler	Molecular titration and ultrasensitivity in regulatory networks	20
70	Wang	Funneled energy landscape leads to robustness of the cellular networks	20
71	Myers	Satisfiability and sequence niches in cellular signaling	20

Session 8 SIGNALING AND COMMUNICATIONS

WEDNESDAY 12/6/2006, 9:00 AM

P. Niyogi

#	<u>Iname</u>	<u>Title</u>	<u>Talk Length</u>
72	Laughlin	The determination of signaling efficiency in cellular systems	25
73	Luo	Olfactory coding and discrimination in <i>Drosophila</i>	20
74	Chklovskii	Understanding brain design using optimization theory	20
75	Asthagiri	Parsing the molecular and cellular crosstalk underlying multicellular patterning	20
76	Samuel	A biophysical approach to behavioral neuroscience in <i>C. elegans</i>	20
77	Kugler	Modeling <i>C. elegans</i> vulval cell fate specification—System design meets biology	20