

# BICS2004: Biologically Inspired Systems - Conference Programme

(For the papers themselves, please go to the Table of Contents)

**Monday August 30 2004**

## **Plenary Session**

**Monday, August 30, 2004: 09:00-10:10, LTB4**

09:00	09:10	Introduction	Prof L S Smith	-
09:10	10:10	Plenary Lecture	Prof R. Douglas	Fifteen years of Neuromorphic Engineering: progress, problems, and prospects

## **Session BIS1: Audition and Robotics**

**Monday, August 30, 2004 10:10-12:50, LTB4**

10:10	Prof Gerald Langner	Temporal processing in the auditory system
10:30	Prof Leslie Smith, Dagmar Fraser	Onsets: an element of ecological sound interpretation
10:50	Tea/Coffee	
11:10	Ms Natasha Chia, Dr Steve Collins	Biologically inspired binaural analogue signal processing
11:30	Dr Steve Potter, Thomas B. DeMarse, Douglas J. Bakkum, Mark C. Booth, John R. Brumfield, Zenas Chao, Radhika Madhavan, Peter A. Passaro, Komal Rambani, Alexander C. Shkolnik, R. Blythe Towal, Daniel A. Wagenaar	HYBROTS: hybrids of living neurons and robots for studying neural computation
11:50	Dr Emilia Barakova	Familiarity gated learning for inferential use of episodic memories in novel situations - a robot simulation
12:10	Mr Anthony Meehan, Mr. Jason Garforth, Dr. Sue McHale	Executive Attention and Action Selection in a Neurally Controlled Simulated Robot
12:30	Ms Yi Chen, Prof Juyang Weng	A Case Study of Developmental Robotics in Understanding "Object Permanence"

## **Session NC1: Computational Neural Network Models: 1**

**Monday, August 30, 2004, 10:10-12:50, LTB3**

10:10	Ms J. Boulahia Smirani	A New Technique for Neural Network Explanation
10:35	Mr Raz Tamir	Clustering Human Associations
11:00	tea/coffee	
11:20	Mr Kazunori Iwata, Kazushi Ikeda, Prof Hideaki Sakai	Stochastic Complexity of Reinforcement Learning
11:45	Mr Ramin Pichevar, Prof Jean Rouat	Oscillatory Dynamic Link Matching for Invariant Pattern Recognition
12:10	Discussion	

## **Session CNS1: Attention and Emotion**

**Monday, August 30, 2004, 10:10-12:20, LTB2**

10:10	Prof Roman Borisyuk, Yakov Kaznovich,	Synchronisation-based computational model of attention-guided object selection and novelty detection
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10:35	Prof John Taylor, Nikolaos Fragopanagos	Modelling the Interaction of Attention and Emotion
11:00	tea/coffee	
11:20	Mr L. Andrew Coward	The Recommendation Architecture Model for Human Cognition
11:55	Discussion	

## **WORKSHOP: Information coding in early sensory stages**

*Workshop co-chairs:*  
*Carolina Varela Rodríguez*  
*Eduardo M. Sánchez Vila*

### **Monday, August 30, 2004, 13:45-15:45, 2B74**

13:45	14:15	Varela Rodríguez, C	The role of the retinal bipolar cells in the sequential processing of the visual information.
13:45	14:15	Navarro J., Canedo A. and Sánchez E.	Spatio-temporal information coding in the cuneate nucleus.
14:45	15:15	Hirayama J., Joshimoto J. and Ishii S	Cortical representation learning regulated by Acetylcholine.
15:15	15:45	Coward A.	Simulation of a proposed binding model.

### **Session BIS2: Vision1: Neuromorphic Approaches**

#### **Monday, August 30, 2004, 13:45-15:45, LTB4**

13:45	Dr Jordi Madrenas, Jordi Cosp, Oscar Lucas, Eduard Alarcón, Eva Vidal, Gerard Villar	Architecture and Basic Blocks of a Neuromorphic Analogue VLSI Vision System
14:10	Ms Chiara Bartolozzi, Giacomo Indiveri	A neuromorphic selective attention architecture with dynamic synapses and integrate-and-fire neurons
14:35	Mr Kimihiro Nishio, Hiroo Yonezu, Yuzo Furukawa	Analog two-dimensional network for motion detection
15:00	Mr Kazuhiro Shimonomura, Tetsuya Yagi	An orientation selective multi-chip aVLSI system for parallel image processing
15:20	Dr Margarita Kuzmina, Eduard Manykin	Biologically motivated oscillatory network model for dynamical image segmentation

### **Session NC2: Computational Neural Network Models: 2**

#### **Monday, August 30, 2004, 13:45-15:50, LTB3**

13:45	Mr Omari Abdallah	Development of a New Neuronal Network Technology
14:10	Dr Ryotaro Kamimura	Supervised Information-Theoretic Competitive Learning by cost-sensitive information maximization
14:35	Dr Kazushi Ikeda, Tsutomu Aoishi	Effects of Soft Margins on Learning Curves of Support Vector Machines
15:00	Prof G. N. Marichal, J. Toledo, L. Acosta, L. Moreno	A neuro-fuzzy architecture for improving the performance of a classical controller
15:25	Mr. A. Zayed, Dr A. Hussain	A New Non-linear Multi-variable Multiple-Controller incorporating a Neural Network Learning Sub-Model

**Session CNS2: Representation and Modelling**

**Monday, August 30, 2004, 13:45-15:30, LTB2**

13:45	Dr Carmen M. Bretones Callejas	Embodied Construction Grammar Approach to Compositinality and Conceptual Representation
14:10	NR Taylor, M Hartley, JG Taylor	The Learning of Insertions by the Cerebellum
14:35	Dr YingLiang Ma, Helena Paterson, Alexander Dolia, Sung-Bae Cho, Ales Ude, Frank Pollick	Towards a biologically-inspired representation of human affect
15:00	Dr Simon Levy	Neuro-fractal composition of meaning: toward a collage theorem for language

**Plenary Session**

**Monday, August 30, 2004, 16:15-17:15, LTB4**

16:15	17:15	Prof John G Taylor	Attention and Consciousness as Control System Components in the Brain
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## **Tuesday Aug31 2004**

### **Plenary Session**

#### **Tuesday, August 31, 2004: LTB4**

09:00	10:00	Dr. O Holland	Computation, cognition, and control
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### **Session BIS3: Vision 2**

#### **Tuesday, August 31, 2004, 10:00-11:00: LTB4**

10:00	Claudio Castellanos Sánchez, Bernard Girau, Frédéric Alexandre	A connectionist approach for visual perception of motion
10:20	Mr Sinan Kalkan, Dirk Calow, Michael Felsberg, Florentin Worgotter, Markus Lappe, Norbert Krueger	Optic Flow Statistics and Intrinsic Dimensionality
10:40	Mr Shu-Fai Wong, Kwan-Yee Kenneth Wong	Neurally Inspired Object Tracking System

### **Plenary Debate on Machine Consciousness**

11:20	12:45	Machine Consciousness: Does it Make Sense?
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#### **Tuesday August 3, 2004, 11:20-12:45, LTB4**

### **Session BIS4: Vision 3**

#### **Tuesday, August 31, 2004, 13:45pm-14:45pm, LTB4**

13:45	Dr Zhijun Yang, Alan F. Murray,	Vision Coincidence Detection with STDP Adaptation for Object Recognition and Depth Analysis
14:05	Mr Venkateswaran Nagarajan, R Chidambareswaran, B. Harish	A novel perspective into the neuronal encoding along the retinal pathway employing time-frequency transformation: part 1 — for object
14:25	Mr Venkateswaran Nagarajan, B. Harish, R Chidambareswaran	A novel perspective into the neuronal encoding along the retinal pathway employing time-frequency transformation: part 2 — for color

### **Session NC4: Software and Hardware Implementations**

#### **Tuesday, August 31, 2004, 13:45-15:00, LTB3**

13:45	Dr Victoria Hodge, Dr. Simon O'Keefe, Prof. Jim Austin	A Binary Neural Decision Table Classifier
14:10	Dr Il Song Han	Mixed-signal neuron-synapse implementation for large scale neural network
14:35	Mr Stefan Philipp, Johannes Fieres, Andreas Gruebl, Prof Karlheinz Meier, Johannes Schemmel, Felix Schuermann	A Platform for Parallel Operation of VLSI Neural Networks

### **Session CNS4: Agent Consciousness**

#### **Tuesday, August 31, 2004, 13:45-15:00, LTB2**

13:45	Mr Ivan Moura, Pierre Bonzon	A Computational Framework for Implementing Agent Consciousness
14:10	Mr Hugo Marques, Eugénio Oliveira	Stereoscopic depth: a biological inspired judgement
14:35	Dr Stefano Piva, Luca Marchesotti, Carlo Bonamico, Carlo Regazzoni	Context based message selection strategies in a biologically inspired ambient intelligence system

**Plenary Session**  
**Tuesday August 31, 15:00-16:00, LTB4**

15:00	16:00	Prof G. Hesketh	Neural Networks: the hype and the reality from an industrial perspective.
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**Poster Session:**  
**Tuesday, August 31, 2004, 16:00-17:30, 2X1**

P1	CNS6.1	Prof John Taylor	A Mathematical Framework for the Global Brain
P3	CNS6.3	Mr Rabinder Lee	Demonstrating Volition and Affective Decision Making in Brain-Inspired Neural Models
P4	BIS8.1	Dr Eduardo Ros Vidal, Sonia Mota, Javier Díaz	Neural multilayer structure for motion pattern segmentation
P5	BIS8.2	Dr Toshinori Deguchi, Naohiro Ishii	On Refractoriness of Chaotic Neurons in Incremental Learning
P6	BIS8.3	Mr Nicolas Pugeault, Florentin Woegoeffer, Norbert Krueger	Grouping Over Stereo for Visual Cues Disambiguation
P7	BIS8.4	Mr Matthew Hartley, Neill Taylor and Prof John Taylor	Modelling STDP: sequence learning and recall
P8	BIS8.5	Ms Milana Mileusnic, Gerald E. Loeb	How your brain knows where your hand is
P9	BIS8.6	Dr. V. Tereshko	Development of retinotopy and ocular dominance by soft topology-preserving maps and elastic nets: Deriving one class of the models from another
P10	NC6.1	Dr. A Hussain	A new approach to Adaptive Multi-band Speech Enhancement using Neural Networks and post-Weiner Filtering
P11	NC6.2	Mr Mohamad Omar-Khaidzir, M.O. Tokhi	Application of ear-brain analogy for sound spectral response characterisation in non-destructive material evaluation
P12	NC6.3	Mr Ahsan Abdullah, Dr. A Hussain	Analysis of Unsupervised Clustering by Crossing Minimization
P13	NC6.4	Mr Ahsan Abdullah, Dr A. Hussain	A New Bi-clustering Technique based on Crossing Minimization

**Conference Dinner**  
**(Stirling University Management Centre)**

19:00	22:00	Conference Dinner	Management Centre
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**Wednesday, September 1, 2004**

**Plenary Session**

**Wednesday Sept 1, 2004, 09:00-11:00, LTB4**

start time	end time	event	presenter/chair	title	location
09:00	10:00	Plenary Lecture	Prof D Willshaw	Self-Organisation in the Nervous System: the Establishment of Nerve Connections by an Inductive Mechanism	LTB4
10:00	11:00	Plenary Lecture	Prof E Oja	Disentangling signals blindly from nonlinear mixtures	LTB4

**Session BIS5: Neural Modelling**

**Wednesday, September 1, 2004, 11:20-13:00, LTB4**

11:20	Mr Gregor Kiddie, Dr Arjen van Ooyen, Dr Bruce Graham	Biologically Plausible Model of Growing Neurites
11:40	Dr Stéphane Binczak, M. S. Jacquir, Prof. J.M. Bilbault, V.B. Kazantsev and V.I. Nekorkin	Unilateral coupling between two MFHN electronic neurons
12:00	Dr Laura Bonzano, Marco Bove, Prof. Sergio Martinoia	Effects of NMDA and non-NMDA receptors antagonists on the behavior of cultured cortical networks
12:20	Mr Eilif Mueller, Prof Karlheinz Meier, Dr Johannes Schemmel	Methods for Simulating High-Conductance States in Neural Microcircuits
12:40	Dr Valery Tereshko, Alexander N. Pisarchik	Controlling the cortex state transitions by altering the oscillation energy

**Session NC5: Neural Network Applications**

**Wednesday, September 1, 2004, 11:20-13:00, LTB3**

11:20	Mr Ricardo Malheiro, Rui Pedro Paiva, António José Mendes, Teresa Mendes, Amílcar Cardoso	Classification of recorded classical music: a methodology and a comparative study
11:45	Prof Kuniyuki Fukushima, Masayuki Kikuchi	Symmetry Axis Extraction by a Neural Network
12:10	Mr Venkata Ramanan, N.V.Kalpakkam, J.S.Sahambi	A Novel Technique for Detection and Denoising of Ocular Artefacts in Normal and Epileptic Electroencephalogram
12:35	Ms.Ir. Maryam Miradi	Application of artificial neural network in prediction of porous asphalt durability

**Session CNS5: Neurological Analysis**

**Wednesday, September 1, 2004, 11:20-12:45, LTB2**

11:20	Mr Thang Hoang, Wael El-Deredy, Paulo J. G. Lisboa, Francis McGlone	Inter-trial phase synchronisation in the ERP Delta band accounts for differences in oddball P300
11:45	Mr Thang Hoang, Wael El-Deredy, Deborah E. Bentley, Anthony K.P. Jones, Paulo J. Lisboa, Francis McGlone	Dipole source localisation using independent components analysis: single trial localisation of laser evoked pain
12:10	Mr Martin Böhme, Christopher Krause, Dr.-Ing. Erhardt Barth, Prof. Dr. rer. nat. Thomas Martinetz	Eye Movement Predictions Enhanced by Saccade Detection

12:35

Discussion



**Session BIS6: Neuromorphic and spiking networks and BSS****Wednesday, September 1, 2004, 13:45-15:30, LTB4**

13:45	Mr Qingxiang Wu, T. M McGinnity, LP Maguire, B Glackin and A Belatreche	Supervised Training of Spiking Neural Networks with Weight Limitation Constraints
14:05	Ms Sunny Bains	Extending neuromorphic engineering beyond electronics
14:25	Dr Tim Pearce, Thomas J. Koickalb, Carlo Fulvi-Maria, James A. Covington, Forest S. Tan, Julian W. Gardner, Alister Hamilton	Silicon-based neuromorphic olfactory pathway implementation
14:45	Dr Derek Linkens, Ching-Hua Ting, Wei-Hao Wu, A Angel	Optimising the connectivity coefficients in the somatosensory pathway using Genetic Algorithms
15:05	Dr Motoaki Kawanabe	New algorithms for blind separation when sources have spatial variance dependencies

**Session BIS7: Novel approaches****Wednesday, September 1, 2004, 15:50-17:10, LTB4**

15:50	Mr Philip Zeman, N. J. Livingston, W. H. Hook and P. F. Driessen	Creation of a custom basis for detection of a neural physiological event in EEG
16:10	Dr Gerd Heinz	Interference Networks - a Physical, Structural and Behavioural Approach to Nerve System
16:30	Prof Naohiro Ishii, Dr.Toshinori Deguchi, Prof. Hiroshi Sasaki	Biological Asymmetric and Parallel-Symmetric Neural Networks with Nonlinear Functions
16:50	Mr Venkateswaran Nagarajan, R Rajesh	Partitioned Parallel Processing Approach for Predicting Multi-Million Neuron Interconnectivity in the Brain : Involving Soma-Axon-Dendrites-Synapse