Wednesday–June 15, 1994

8:00–8:30 am	Coffee
	Adaptation, Learning, and Neural Networks **Chairperson: W. T. Miller III (University of New Hampshire)**
8:30	L. G. Kraft III (University of New Hampshire) *Adaptive Predictive Control for Inverted Pendulum and Stability of Open Loop CMAC Learning*
8:50	Y. He (UPS) *Handwritten Word Recognition Using an Adaptive Length Viterbi Algorithm*
9:10	S. Omatu (University of Tokushima) *Adaptive and Learning Control by Neural Networks*
9:30	E. Henis, S. Levinson, and A. Gorin (AT&T Laboratories) *Mapping Natural Language and Sensory Information into Manipulatory Actions*
9:50–10:10	Coffee Break
	Adaptive Control I **Chairperson: L. G. Kraft III (University of New Hampshire)**
10:10	G. Leitman (University of California at Berkeley) *Adaptive Control for Survival in Windshear*
10:30	M. J. Grimble (University of Strathclyde) *H-∞ Robust Adaptive Control for Uncertain Nonlinear Systems*
10:50	R. M. Murray (California Institute of Technology) *Trajectory Generation for Nonlinear Control Systems*
11:10	A. M. Annaswamy (Massachusetts Institute of Technology) *Intelligent Adaptive Control Design*
11:30	Discussion
12:00–1:30 pm	Lunch
	Adaptive Control II **Chairperson: A. M. Annaswamy (Massachusetts Institute of Technology)**
1:30	K. S. Narendra and J. Balakrishnan (Yale University) *Adaptive Control Using Switching and Tuning*
1:50	M. Lemmon and C. Bett (University of Notre Dame) *Inductive Learning of Logically Stable Hybrid Control Systems*
2:10	H. Unbehauen and Y. Nazaruddin (University of Ruhr–Bochum) *An Adaptive State Feedback Controller and its Practical Application*
2:30	H. Kaufman, C. M. Held, A. Nayak, R. Roy, B. W. Bequette, and R. S. Gopinath (Rensselaer Polytechnic Institute) *Adaptive and Fuzzy Control of Anaesthetic and Hemodynamic States*
2:50–3:10 pm	Coffee Break
	Adaptive Control III **Chairperson: H. Kaufman (Rensselaer Polytechnic Institute)**
3:10	W. K. Ho, C. C. Hang, W. Wojsznis, and Q. H. Tao (National University of Singapore) *Frequency Domain Approach to Self-Tuning PID Control*
3:30	A. Alleyne (University of California at Berkeley) *Switching Adaptive Control of Automotive Active Suspension*
3:50	J. D. Boskovic (Yale University) *Stable Adaptive Control of a Class of Fed-Batch Fermentation Processes*
4:10	M. Tadjine, M. M'Saad, and L. Dugard (Laboratoire d'Automatique de Grenoble) *Delta Operator Adaptive Partial State Reference Model Adaptive Controller with Loop-Transfer Recovery*
4:30–5:15	Discussion

The Eighth Yale Workshop on Adaptive and Learning Systems

Center for Systems Science
Dunham Laboratory, Yale University
New Haven, Connecticut

Program
June 13–15, 1994

Monday–June 13, 1994

7:45–8:15 am **Coffee and Registration**

8:15–8:30 Welcoming Remarks—K. S. Narendra

Biological Systems I
Chairperson: S. T. Venkataraman (Jet Propulsion Laboratory)

8:30 T. Carew (Yale University)
Dynamic Gain Control Through Potentiated Recurrent Inhibition in an Identified Neural Network of Aplysia

8:50 J. C. Houk, J. Buckingham, and A. G. Barto (Northwestern University)
Direct Adaptive Control of Nonlinear Limb Mechanics by a Distributed Modular Model of the Cerebellum and Motor Cortex

9:10 E. L. Schwartz (Boston University)
Space-Variant Active Vision and Functional Architecture in Primate Visual Cortex

9:30 F. Mussa-Ivaldi (Northwestern University)
The Superposition of Vector Fields: A Theoretical and Experimental Framework for Motor Learning and Control in Biological Systems

9:50–10:10 Coffee Break

Biological Systems II
Chairperson: J. C. Houk (Northwestern University)

10:10 S. T. Venkataraman (Jet Propulsion Laboratory)
Gait Formation and Gait Adaptation During Static Leg Locomotion

10:30 R. Full (University of California at Berkeley)
Inspiration from Insects in the Design of Legged Robots

10:50 J. Gelfand, J. Shi, S. Lane, and D. Handelman (Princeton University)
Learning Robotic Sensor Integration Through Practice

11:10 M. A. Srinivasan (Massachusetts Institute of Technology)
Virtual Haptic Environments: Facts Behind the Fiction

11:30 Discussion

12:00–1:30 pm Lunch

Robotics I
Chairperson: D. J. Kriegman (Yale University)

1:30 B. Wilcox (Jet Propulsion Laboratory)
Planetary Exploration with Micro-Rovers: Experimental Evaluation and Flight System Development

1:50 M. T. Mason (Carnegie Mellon University)
Robotic Manipulation: Progress and Plans

2:10 T. Fukuda and T. Shibata (Nagoya University)
Adaptation and Learning in Hierarchical Intelligent Control of Robotic Motion

2:30 J. Burdick (California Institute of Technology)
Nonholonomic Mechanics and Locomotion

2:50–3:10 Coffee Break

Robotics II
Chairperson: J. Gelfand (Princeton University)

3:10 B. Vijayakumar, D. J. Kriegman, T. Joshi, and J. Ponce (Yale University)
Towards Invariant-Based Recognition of Complex Curved Objects in Images

3:30 R. Playter (Massachusetts Institute of Technology)
Strategies for the Control of Gymnastic Maneuvers

3:50 L. L. Whitcomb (Woods Hole Oceanographic Institution)
High Performance Adaptive Force Control of Robot Arms: Theory and Practice

4:10 P. N. Belhumeur (Harvard University)
Why is Binocular Stereopsis Important?

4:30–5:15 Discussion

5:15 Reception–Calhoun College

Tuesday–June 14,1994

8:00–8:30 am Coffee

Learning
Chairperson: R. M. Wheeler, Jr. (Sandia National Laboratories)

8:30 A. G. Barto, S. J. Bradtke, and B. E. Ydstie (University of Massachusetts–Amherst)
A Reinforcement Learning Method for Direct Adaptive Linear Quadratic Control

8:50 R. S. Sutton and S. P. Singh (GTE Laboratories)
Maximum-Likelihood Step Size in Temporal-Difference Learning

9:10 H. Benbrahim and J. A. Franklin (GTE Laboratories)
Self-Scale Reinforcement: A New Algorithm for Intelligent Control

9:30 A. W. Moore (Carnegie Mellon University)
Variable Resolution Reinforcement Learning

9:50 R. J. Williams and L. C. Baird III (Northeastern University)
Tight Performance Bounds on Greedy Policies Based on Imperfect Value Functions

10:10–10:30 Coffee Break

Neural Networks I
Chairperson: K. S. Narendra (Yale University)

10:30 P. J. Werbos (National Science Foundation)
The Brain as a Neurocontroller: New Hypotheses and New Experimental Possibilities

10:50 A. N. Michel, K. Wang, and H. Yeh (University of Notre Dame)
Qualitative Limitations Encountered in the Implementation Process of Feedback Neural Networks: Delays, Parameter Perturbations, and Interconnection Constraints

11:10 S. Haykin and L. Li (McMaster University)
Nonlinear Adaptive Prediction of Nonstationary Time Series

11:30 Discussion

12:00–1:30 pm Lunch

Neural Networks II
Chairperson: H. E. Rauch (Lockheed)

1:30 E. Mjolsness (Yale University)
Algebraic and Grammatical Methods in Relaxation Nets

1:50 C. L. Giles and B. G. Horne (NEC Research Institute)
Representation and Learning in Recurrent Neural Network Architectures

2:10 R. K. Mehra (Scientific Systems, Inc.)
System Identification and Neural Networks: Similarities and Differences

2:30 K. S. Narendra, S-M. Li, and J. B. D. Cabrera (Yale University)
Intelligent Control Using Neural Networks

2:50–3:10 Coffee Break

Neural Networks III
Chairperson: C. L. Giles (NEC Research Institute)

3:10 H. E. Rauch (Lockheed)
Adaptive Control and Fault Accommodation Using Neural Networks

3:30 W. T. Miller III, S. M. Scalera, and A. Kun (University of New Hampshire)
Neural Network Control of Dynamic Balance for a Biped Walking Robot

3:50 M. Lloyd-Hart (University of Arizona)
Application of ANN to Real-Time Removal of Atmospheric Blurring of Astronomical Images

4:10 L. Feldkamp, G. V. Puskorius, L. I. Davis, Jr., and F. Yuan (Ford Motor Company)
Enabling Concepts for Applications of Neurocontrol

4:30–5:15 Discussion