



Call for Participation:

**One-day Workshop jointly sponsored by the
IEE and the EPSRC Novel Computation Cluster:**

“Intelligent Modeling for Control of Complex Systems (IMOCCS)”

Date: Friday, 23 January, 2004

Venue: University of Strathclyde in Glasgow, James Weir Building, Montrose St., Room M422A

Workshop Organizers/Co-Chairs:

Prof. Mike Grimble (Industrial Control Centre, University of Strathclyde, UK)
Dr. Amir Hussain (Centre for Cognitive & Computational Neuroscience, Stirling University, UK)
Dr. Andrzej Ordys (Industrial Control Centre, University of Strathclyde, UK)

Confirmed Keynote Speakers:

Prof. Najim, ENCIGC, France
Prof. Owens, University of Sheffield,
Prof. Wang, UMIST
Dr. Kambhampati, University of Hull
Dr. Saez, University of Chile

Workshop Description: "Intelligent Modeling for Control of Complex Systems"

The past decade has experienced a great deal of interest in developing intelligent modelling approaches which produce complex models or controllers by piecing together a number of simpler subsystems. This divide-and-conquer strategy is a long-standing and general way of coping with complexity in engineering systems, nature and human problem solving.

Multiple model approaches are directly based on the divide-and-conquer strategy, in the sense that the core of the representation of the model or controller is a partitioning of the system's full range of operation into multiple smaller operating regimes, with each of which is associated a locally valid model or controller. What is needed is the creative development of a new computational framework in order to better allow the integration of human knowledge with automated learning. One underlying question for instance, is "how should we partition the system - what is local"?

The primary reason for using multiple models is to detect changes in the environment and initiate appropriate action. Many other reasons can also be given for using multiple models, besides detecting changes in the environment. For example, when all the information needed to design a controller is not available (e.g. delays, bound disturbance, etc.) multiple models can be used to estimate them. Another important point could be to combine the advantages of different controllers, to achieve both stability and improved performance, which are two features of principal interest to the control theorist. Development of intelligent multiple-model or more advanced autonomous multi-agent based frameworks for adaptively controlling complex non-linear systems with large and/or rapidly varying parameters will require fundamental research into several important inter-disciplinary areas, such as non-linear mathematics, computing science and control engineering.

The aim of this EPSRC Cluster/IEE organized one-day workshop is to provide a forum to explore fundamental research issues relating to the development and role of intelligent multiple-model based learning control systems for coping with real-world complex processes. There will be several keynote speeches by renowned international experts culminating in an open-discussion on the ways forward in this emerging inter-disciplinary field.

There will also be a presentation on the activities and progress of the EPSRC's Novel Computation Initiative funded Cluster Project "Towards Multiple model based Learning Control Paradigms for Complex Systems", whose aim is to produce a few high-quality collaborative research proposals by end June 2004. The EPSRC Cluster is operating in an open mode, and this workshop will provide an opportunity to the participants to explore research collaboration links with other Core Cluster members.

Registration for the workshop is free but is required, as the number of places is limited and a light lunch is being provided. For further details on registration (including maps, travel and hotels), and a provisional Workshop program/schedule, please visit the EPSRC Cluster website:

www.cs.stir.ac.uk/ControlCluster/