



# Aston University

Engineering & Applied Science



## Rigorous, Relevant Research

## Neural Computing

### ► Introduction

The goal of the Neural Computing Research Group (NCRG) is to develop analytical methods to penetrate the heart of difficult problems concerning information in complex systems, and to use the acquired insight to deliver solutions applicable to very diverse theoretical and practical contexts.

### ► Sponsors and funders

Members of the NCRG are partners in eight EU projects, lead two multi-partner EPSRC grants, and have funding from a range of sources including RCUK, EPSRC, NERC, Leverhulme and commercial sources. The group's state-of-the-art research facilities have been funded mostly through projects and research income; they include the Wolfson-Royal Society research laboratory and three specialist computer clusters funded by EPSRC, the EU and AWM.

### ► Academic partners

The NCRG has links to groups and individuals across the UK, Europe and beyond. It has ongoing collaborations with academics including experts in Germany, Hong Kong, Japan and Israel. Within the UK there are links to industrial partners, for example Pfizer and GlaxoSmithKline, and government bodies including the Central Science Laboratories and the Met Office.

### ► Key projects

The NCRG is active in promoting topics in the area of complexity, both nationally and within the EU working in projects such as:

- BioPattern ([www.biopattern.org](http://www.biopattern.org)), the largest EU network of excellence in the eHealth activity;
- Evergrow ([www.evergrow.org](http://www.evergrow.org)), an EU integrated project examining issues of complexity in the future internet;
- MUCM ([mucm.group.shef.ac.uk](http://mucm.group.shef.ac.uk)), an RCUK funded multi-site project dealing with managing uncertainty in complex models.

### ► Applications

The application areas themselves range from environmental modelling and biomedical research to problems in communication and computational complexity. The NCRG has produced highly influential software tools (Netlab, MILVA, DVMS) with thousands of users and holds patents on several developments within the group.

### ► Recent publications

- Maniyar DM, Nabney IT, Williams BS and Sewing A, 2006 "Data Visualization during the Early Stages of Drug Discovery" *Journal of Chemical Information and Modeling*, 46, 1806-1818.
- Neirotti JP and Saad D, 2007 "Inference by Replication in Densely Connected Systems" *Phys. Rev. E*, 76, 046121 (2007).
- Herzallah R and Lowe D, 2007 "Distribution Modeling of Nonlinear Inverse Controllers under a Bayesian Framework" *IEEE Transactions on Neural Networks*, 18(1), pp 107-114, 1045-9227.
- Kühn R, Van Mourik J, Weigt M and Zippelius A, 2007 "Finitely coordinated models for low-temperature phases of amorphous systems" *Journal of Physics A*, 40, 9227-9252.
- Archambeau C, Opper M, Shen Y, Cornford D, and Shawe-Taylor J, 2008 "Variational Inference for Diffusion Processes" *Advances In Neural Information Processing Systems 20*, Eds: Platt JC, Koller D, Singer Y and Roweis S, The MIT Press, Cambridge, Massachusetts, pp 17-24.

### Key contacts

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