

# PhD Studentship

## Computational Intelligence Research Group (CIRG)

### ***School of Design, Engineering and Computing, Bournemouth University, United Kingdom***

Applications are invited for a 3 year PhD research studentship to work on a project entitled "**Physically Inspired Artificial Learning Models**" funded by Bournemouth University and to be carried out in collaboration with British Telecommunications (BT) Intelligent Systems Labs, one of the largest industrial R&D labs of this type in UK..

The main aim of the proposed research project is to explore and investigate the **tremendous similarities between physical world and artificial intelligence** in the context of machine learning in order to find inspirations and design the new breed of nature-inspired classification, clustering and regression techniques that would be capable of learning more efficiently from large sources of uncertain multi-type data and information.

This research intends to bridge the gaps between the two sciences and provide more efficient and intelligent means for fuller exploitation of numerical, categorical, and multimedia evidence to the artificial learning problems. Inspirations for the artificial learning modelling are to be sought from the three core interactions between the physical world and information systems grouped around the thermodynamics of information and its implications on the perception of knowledge and complexity, multifaceted information uncertainty modelling based on the analogy with physical energy and the optimisation with intelligent search models based on various data-particles interactions subjected to various physical fields.

Within the theoretical part of the project the main effort will be directed towards development of methodologies for broader exploitation of uncertain and imprecise multi-type evidence in the process of learning within which an exercise of evaluation of multidimensional information uncertainty along the typical learning process could be recommended. A combination of statistical modelling and fuzzy sets analysis with the elements of mathematical theory of evidence is expected to be central to this part of the project. The practical part of the project will feed from the newly introduced information theoretical learning and the pioneering work on physical data fields and use numerous physically inspired modelling mechanisms to develop robust classification, clustering and regression techniques. Large part of this work is expected to be dedicated to dynamic data-particle based optimisation processes based on physical fields interaction and possibly including adaptable population characteristics common to swarm intelligence, ant-colony behaviour and deterministic annealing.

The student will be joining a Computational Intelligence Research Group and will be primarily based in the School of Design, Engineering & Computing in Bournemouth but will also have an opportunity to frequently visit and work for up to 2 months in each year of the project duration at the BT Intelligent Systems Labs in Ipswich.

The studentship carries a basic remuneration of £12900 pa tax-free and payment of tuition fees at home/EU rate. The successful applicant will normally need to be an EU citizen though a limited number of studentships is available for outstanding non-EU candidates.

Applicants should have a strong mathematical background and hold a first or upper second class honours degree or equivalent in computer science, mathematics, physics, engineering, statistics or a similar discipline. Additionally the candidate should have strong programming experience using any or combination of C++, Matlab or Java.

For further details please contact Prof Bogdan Gabrys, e-mail: [bgabrys@bournemouth.ac.uk](mailto:bgabrys@bournemouth.ac.uk) or visit the following www pages: [http://dec.bournemouth.ac.uk/staff/bgabrys/PhD\\_Studentship\\_2007.html](http://dec.bournemouth.ac.uk/staff/bgabrys/PhD_Studentship_2007.html).

Interested candidates should follow the application procedure listed on the University of Bournemouth web pages: [http://www.bournemouth.ac.uk/research/studentships/how\\_to\\_apply.html](http://www.bournemouth.ac.uk/research/studentships/how_to_apply.html).

Further details concerning the studentship and application procedure can be also obtained from the School of DEC Research Administrator - Ms Jo Sawyer, Email: [jsawyer@bournemouth.ac.uk](mailto:jsawyer@bournemouth.ac.uk). Tel: +44 (0)1202 965985