

---

**Two possible PhD positions** are offered in the intersection between the area of Multi-agent Systems and the areas of Machine Learning and Computer Vision, respectively. For more information see the ads below and contact Dr Maria Chli ([maria-chli.org](http://maria-chli.org), [m.chli@aston.ac.uk](mailto:m.chli@aston.ac.uk)) or Dr George Vogiatzis ([george-vogiatzis.org](http://george-vogiatzis.org), [g.vogiatzis@aston.ac.uk](mailto:g.vogiatzis@aston.ac.uk)).

---

## 1. PhD Title: Trust and Reputation in Multi-agent Systems

The recent trend in computing is towards increasingly larger, open and distributed systems such as electronic marketplaces (eBay), distributed file and information sharing systems (Gnutella, BitTorrent), social and professional networking sites (Facebook, LinkedIn). These are used by numerous human and software agents, each acting in a self-interested manner and often required to make decisions under uncertainty. Ensuring users enjoy a useful, fair service of consistent quality is difficult to achieve through enforcing centralised control measures due to the distributed and largely anonymous nature of these systems.

This project will deliver a fully automated trust and reputation decision-making system to be used locally by each participant. It will formulate a fully probabilistic framework for modelling trust and reputation. The model needs to allow for realistic assumptions, describing interactions in a marketplace or a social network context, and yet be general enough so that it can adapt to different scenarios.

**The successful applicant** will have a strong undergraduate and/or masters degree in computer science, engineering, mathematics or a related discipline as well as excellent programming and analytical/mathematical skills. A demonstrable interest in agent systems and probabilistic modelling is essential.

This studentship is combined with a **teaching assistant role**. The successful candidate will be required to carry out up to seven hours per week of teaching support for a distance learning programme under the direction of the project supervisor; therefore the student must be capable of teaching on a specific module. Details of teaching responsibilities and a list of taught modules can be found on the Aston University website by searching for Job Reference: R14031

### Funding Notes:

This studentship includes a fee bursary to fully cover the home/EU fees rate plus a maintenance allowance of starting at £15,500 in the first year. Applicants from outside the EU may apply for this studentship but will need to pay the difference between the 'Home/EU' and the 'Overseas' tuition fees, currently this is £10,914 in 2014/15.

**For further information**, please contact Dr Maria Chli ([maria-chli.org](http://maria-chli.org), [m.chli@aston.ac.uk](mailto:m.chli@aston.ac.uk)) or Dr George Vogiatzis ([george-vogiatzis.org](http://george-vogiatzis.org), [g.vogiatzis@aston.ac.uk](mailto:g.vogiatzis@aston.ac.uk)).

---

## 2. PhD Title: Visual Validation of Agent-based Simulations of Traffic Systems

Multi-agent simulation is an established tool for analysing traffic systems. The bottom-up modelling of the entities involved (vehicles, pedestrians, etc.) affords the inclusion of a greater level of realism, leading to more accurate simulations. Agent-based modelling has been shown to be very effective in investigating the effects of new policies, traffic incidents, changes in driver behaviour etc.

One of the main challenges of any bottom-up modelling approach is to ensure that the model is faithful to real-world data in a predictive sense. There is no guarantee that a group of individually realistic agents will lead to a multi-agent model that faithfully reproduces reality. This project will overcome this challenge by creating bottom-up traffic models that are, by construction, guaranteed to mimic real-world traffic behaviour. Cameras will be used to capture driver behaviour at points of interest around a traffic network. Using computer vision algorithms, these streams of visual data will be converted to local vehicle tracks capturing key aspects of driver behaviour. Machine learning algorithms will generate a probability distribution of possible driver types. The resulting multi-agent model will consist of samples from this distribution, whose behaviour will be simulated on a real city traffic model. Success of this novel multi-agent calibration methodology in a traffic context will allow it to be extended and generalised to be applicable in a wider range of social and spatial simulations.

**The successful applicant** will have a strong undergraduate and/or masters degree in computer science, engineering, mathematics or a related discipline as well as excellent programming and analytical/mathematical skills. A demonstrable interest in agent systems and probabilistic modelling is essential.

This studentship is combined with a **teaching assistant role**. The successful candidate will be required to carry out up to seven hours per week of teaching support for a distance learning programme under the direction of the project supervisor; therefore the student must be capable of teaching on a specific module. Details of teaching responsibilities and a list of taught modules can be found on the Aston University website by searching for Job Reference: R14031

### **Funding Notes:**

This studentship includes a fee bursary to fully cover the home/EU fees rate plus a maintenance allowance of starting at £15,500 in the first year. Applicants from outside the EU may apply for this studentship but will need to pay the difference between the 'Home/EU' and the 'Overseas' tuition fees, currently this is £10,914 in 2014/15.

**For further information**, please contact Dr Maria Chli ([maria-chli.org](http://maria-chli.org), [m.chli@aston.ac.uk](mailto:m.chli@aston.ac.uk)) or Dr George Vogiatzis ([george-vogiatzis.org](http://george-vogiatzis.org), [g.vogiatzis@aston.ac.uk](mailto:g.vogiatzis@aston.ac.uk)).

---