MARIA CHLI

PERSONAL INFORMATION

URL maria-chli.org and alice.aston.ac.uk
RESEARCH PROFILE: Google Scholar

PROFESSIONAL EXPERIENCE

2015 - 2016	**Deputy Head of Computer Science Group**
2013 -	**Senior Lecturer in Computer Science**
2006 - 2013	**Lecturer in Computer Science**
	Aston University

RESEARCH

1. Founding member of the **ALICE** (The Aston Lab for Intelligent Collectives Engineering) research lab, which operates under **SARI** (System Analytics Research Institute).

2. My research work is in the area of **multi-agent systems**. I am particularly interested in applying **machine learning** techniques to intelligent agents and multi-agent systems. Some recent research highlights:

    a. Using Semi-Markov Decision Processes for **information fusion** and **transfer learning.** This technology is used within broker agents for energy trading and procurement, achieving outstanding results in the PowerTAC (2012-2015) and Supply Chain Management (2015) competition environments.

    b. Coupling multi-agent systems and probabilistic approaches for **mechanism design**; devised a **decentralised supply chain emergence** mechanism utilising **loopy belief propagation**, which outperforms all existing approaches in the area.

    c. Proposed the first **trust and reputation** system to fully rely on probabilistic modelling. Interactions of agents in an electronic marketplace (e.g. eBay) are modelled as a **Hidden Markov Model**. The approach significantly outperforms the state of the art; the resulting paper enjoys a substantial number of citations.

    d. Agent-based modelling for **policy modelling**, including models of migration patterns for highly-skilled workers and the effect of immigration policies (with Dr A. Takenaka), government policy for consumer attitudes to fairtrade products (funded by BIS), effects of social influence and mobility to social violence.

LEADERSHIP

Deputy Head of Computer Science (academic year 2015-2016): duties include line management, staff development, strategy formation, operational management.

- Designing and launching in 2016 a new **MSc Computer Science** - a conversion course offering a unique combination of blended learning (on campus teaching, e-learning and professional experience)**,** building on our track record for employer-based education. This programme is the first of its kind and has received fervent support by the industry. Applied for, and were awarded **£50K of**

HEFCE funding to support the launch of this conversion course in 2016.

- Developed **articulation relationships** with academic institutions in Asia.

TEACHING

- Delivering four modules:
  1. Multi-Agent Systems for final year students
  2. Java Programme Construction: two modules
     (a) for second year undergraduates, and
     (b) e-learning version for degree apprenticeships students,
  3. Operating Systems for second year undergraduates
- Won EAS **teaching quality award**, 2012
- **Year-tutor** for 2nd year combined honours undergraduates 2006-2015
- **Supervision** of masters, individual and group projects. A large number of the students whose projects I have supervised won the **final year project prize** or the **Computer Science Prize**–about **one student each year** (M. Garlick, M. Winsper, I. Macgillivray, J. Holyhead, A. Clark, J. Taylor, N. Mountford, Z. Chobanov)

PHD STUDENT SUPERVISION:

1. Dr Rodrigue Talla-Kuate (initially jointly supervised with M. He), Applying Hidden Markov Models and the Markov Decision Process to Energy Trading, awarded 2016. Developed the AstonTAC agent which **ranked top and runner up in two PowerTAC competitions, 2012**.
2. Dr Michael Winsper, Agent-based supply chain formation, awarded 2012. Now a Consultant at Llamasoft Supply Chain Design software.
3. Mr Michael Garlick, Multi-agent system models for consumer behaviour and policy formation. Progressed and published well (2 papers in highly selective conferences in two years, but withdrew to pursue a career in industry. Now a Software Consultant at ATOS and Big Sky Blue.

INDUSTRIAL LIAISON ROLE

Industrial Liaison for Computer Science since 2012. I have been networking with more than 30 companies interested in recruiting students and establishing research collaborations with the group. Our network of partners includes **IBM, Microsoft, ASOS.com, CapGemini, University Hospitals Birmingham, Majestic, Pinewood** among others.

Aston Computing Partnership, a scheme which will allow us to choose some close collaborators to develop deeper relationships with will launch in spring 2016. This highly innovative scheme will provide our students with interesting graduate and placement opportunities while giving us valuable insight into the needs of industry from higher education in Computer Science. It will also generate a pool of potential industrial partners for KTPs and research projects, helping to raise our profile through **high-impact, top-quality research**.

PERFORMANCE

- My performance was classed as '**exceeding expectations**' at least for the past three years, and was recognised for **exceptional performance, ranking within the top 10% of Aston staff** in terms of contribution in 2015.
- School of Engineering and Applied Science **teaching quality award**, Aston University, 2012. Average student satisfaction on all modules I teach consistently >4.7/5.

2001-2006   **Research Assistant in Electrical and Electronic Engineering Department, Intelligent Systems and Networks Lab.**
Imperial College London

- Acted as Scientific Coordinator of two collaborative European projects ("Evolution and Ecology of Interacting Info-habitants (EEII)" and "Digital Business Ecosystem (DBE)") at the Intelligent Systems and Networks Lab. Collaborated with universities across Europe as well as companies including IBM, Sun and Intel.
- In charge of organizing the scientific and research activities of the lab (6 members), managing the collaboration with partners in order to meet the projects' goals, while also conducting part of the research work.
- Participated in funding applications to the European Commission on behalf of the lab, organizing the research contribution, forming partner network and financial budget. Successful in winning the lab **funding for two RAs and a PhD student for 4 years**, as part of the "Digital Business Ecosystem (DBE)" project (total funding **€10.5M**).

April-Sept. 2000 and June-Sept. 1999   **Industrial Placements-Software Analyst**
J. P. Morgan Investment Management

- Developed database applications interfacing with multiple existing database and data analysis systems of the bank.
- Collaborated with economists in order to develop economic analysis algorithms.

EDUCATION

2001-2005   **PhD in Intelligent Systems,**
Imperial College London

- Thesis title: Convergence and Interactivity in Multi-Agent Systems.
- Thesis supervisor: Prof Philippe De Wilde (now Pro Vice-Chancellor for Research, Innovation and Enterprise, University of Kent)
- Investigated aspects of dynamical behaviour in multi-agent systems. More specifically:
  1. devised criteria for stability of multi-agent systems
  2. studied the information retrieval process using an internet search engine and proposed algorithms for speeding it up,
  3. investigated knowledge exchange among companies, the rationale behind it as well as its effects on a business ecosystem and its market efficiency.

1997-2001   **MEng Computing** (4 year course incl. 9 months in industry),
Imperial College London

2006-2007   Certificate in Learning and Teaching in Higher Education,
Aston University

MOST RECENT PUBLICATIONS

CITATION INFORMATION: Google Scholar

BOOK

M. Chli, P. De Wilde, **Convergence and Interaction in Multi-Agent Systems.**
Series: Advanced Information and Knowledge Processing. Series Editors: L.C. Jain and X. Wu, ISBN 978-1-84882-062-3, London, UK, **Springer**, 2009.

ARTICLES IN JOURNALS

1. M. Chli and M. Winsper, **Using the Max-Sum Algorithm for Supply Chain Emergence in Dynamic Multi-Unit Environments**. *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, pp. 422-435, IEEE, 2015.

2. M. Winsper and M. Chli, **Decentralized supply chain formation using max-sum loopy belief propagation**. *Computational Intelligence,* Volume 29, Issue 2, pages 281-309, Blackwell Publishing Inc., May 2013.

3. M. Chli, P. De Wilde, **The emergence of knowledge exchange: an agent-based model of a software market**. In *IEEE Transactions in Systems, Man and Cybernetics*, Part A, Volume 38, Issue 5, pages 1056-1068, IEEE, September 2008.

4. M. Chli, P. De Wilde, **Internet Search: subdivision-based interactive query expansion and the soft semantic web.** In *Applied Soft Computing, Volume 6, Issue 4, Special Issue on Application of Soft Computing in Information & Communication Technology* (ICT), pages 372-383, Elsevier, August 2006.

ARTICLES IN BLIND PEER-REVIEWED CONFERENCES

1. R. T. Kuate, M. Chli and H. Wang, **An Efficient Knowledge-Transfer Solution to a Novel SMDP Formalisation of a Broker's Decision Problem.** In Proceedings of the Fourteenth International Conference on Autonomous Agents and Multiagent Systems, 2015.

2. R. T. Kuate, M. Chli and H. Wang, **Optimising Market Share and Profit Margin: SMDP-based tariff pricing under the smart grid paradigm**. In Proceedings of the IEEE PES Innovative Smart Grid Technologies Conference Europe, 2014.

3. R. T. Kuate, M. He, M. Chli and H. Wang, **An Intelligent Broker Agent for Energy Trading: An MDP Approach.** In Proceedings of the International Joint Conference on Artificial Intelligence, 2013.

4. M. Winsper, M. Chli, **Using the Max-Sum Algorithm for Supply Chain Formation in Dynamic Multi-Unit Environments.** In Proceedings of the Eleventh International Conference on Autonomous Agents and Multiagent Systems, 2012.

5. M. Winsper, M. Chli, **Decentralised Supply Chain Formation: A Belief Propagation-based Approach.** Proceedings of the 9th European Conference on Artificial Intelligence (ECAI), 2010.

6. G. Vogiatzis, I. MacGillivray, M. Chli, **A Probabilistic Model for Trust and Reputation**. In Proceedings of the Ninth International Conference on Autonomous Agents and Multiagent Systems, 2010.

7. M. Garlick, M. Chli, **An agent-based simulation of lock-in dynamics in a duopoly**. M. Proceedings of the Ninth International Conference on Autonomous Agents and Multiagent Systems, 2010. (**23% acceptance rate**)

8. M. Garlick, M. Chli, **The effect of social influence and curfews on civil violence.** Proceedings of the Eighth International Conference on Autonomous Agents and Multiagent Systems, 2009.

9. M. Winsper, M. Chli, **Effect of mobility on violence in a bi-communal population.** Proceedings of the Eighth International Conference on Autonomous Agents and Multiagent Systems, 2009.

10. M. Chli, P. De Wilde**, Stability of Multi-Agent Systems.** In Eugene Santos Jr. and Peter Willett, editors, *Proceedings of the 2003 IEEE International Conference on Systems, Man and Cybernetics*, pages 551-556, Piscataway, NJ, 2003. IEEE.

11. P. Mariano, M. Simoes Marques, L. Correia, R. Ribeiro, V. Abramov, J. Goossenaerts, M. Chli, and P. De Wilde, **A model for agent mobility and interaction.** In L. Gomes and R. Zurawski, editors, *Proceedings of the 9th IEEE International Conference on Emerging Technologies and Factory Automation*, Piscataway,

NJ, 2003. IEEE.

12. M. Simoes Marques, P. Mariano, R. Ribeiro, L. Correia, M. Chli, P. De Wilde, V. Abramov, and J. Goossenaerts. **Contributions to adaptable agent societies.** In L. Gomes and R. Zurawski, editors, *Proceedings of the 9th IEEE International Conference on Emerging Technologies and Factory Automation*, Piscataway, NJ, 2003. IEEE.

RESEARCH-RELATED ACTIVITES

EUROPEAN COMMISSION EXPERT ROLE
Member of the 'pool of experts' for Future and Emerging Technologies (FET) and H2020, 2010-2016:
- reviewing first-stage and full proposals (over 40 proposals),
- participating in on-site high-level review panels (3 panels),
- evaluating running projects (completed over 10 evaluations), and
- panel member in workshops for shaping new calls (e.g. Global Systems Science Call 2013).

INVOLVEMENT IN CONFERENCE TECHNICAL PROGRAMME PREPARATION

1. Programme Committee and Senior Programme Committee member for the International Joint Conference on Artificial Intelligence (IJCAI)

2. Programme Committee and Senior Programme Committee member for the International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS)

3. Programme Committee for the International Conference on Intelligent Systems Design and Applications (ISDA).

INVITED TALKS AT CONFERENCES AND WORKSHOPS

1. Natural Computing Applications Forum, Aston University, January 2010
2. Home Office's INSTINCT conference on Computing for Security and Anti-terrorism, November 2009
3. Multi-Agent Systems for modelling Complex Systems workshop at the European Conference on Complex Systems 2006 (ECCS '06),
4. Digital Business Ecosystems at the JavaOne conference 2006.

INVITED SEMINARS

1. Electrical Engineering Department, University of Cyprus, October 2012
2. Agents and Intelligent Systems group at King's College London, Kings College London, 2011
3. Economics Research Unit at the Department of Business Innovation and Skills (BIS), 2010

PHD THESIS EXAMINER
1. Dr Matthew Williams, Computer Science, Aston University, 2010.
2. Dr Jan Chircop, Computer Science, Aston University, 2012 and 2014.
3. Dr Henry Franks, Systems and Software Group, Computer Science, Warwick University, 2013.
4. Dr Toni Penya-Alba, Artificial Intelligence Research Institute (IIIA) of the Spanish National Research Council (CSIC) and University of Barcelona, 2014.
5. Dr Ferran Torrent, Artificial Intelligence Group, Department of Electronics, Electricity, and Automation Engineering at the University of Girona, 2015.

MEMBERSHIP OF PROFESSIONAL BODY
IFAAMAS – The International Foundation for Autonomous Agents and Multiagent Systems

REVIEWER FOR ACADEMIC JOURNALS AND PUBLISHERS

1. Journal of Autonomous Agents and Multi-Agent Systems,
2. Journal of Artificial Intelligence Research,
3. IEEE Transactions on Systems, Man and Cybernetics Part B,
4. ACM Transactions on Intelligent Systems and Technology,
5. IEEE Transactions on Multimedia,
6. Springer,
7. Routledge Research.