Curriculum Vitae

Dr. Tao Chen

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Personal Profile

- Proactive and creative researcher.
- Research experience with working in independent or collaborative research projects.
- Teaching experience with undergraduate and postgraduate students.
- Effective administrator and organizer.

Research Interests

My research interests are on *Systems and Software Engineering*. In particular, the focus of my research has been on performance/QoS modeling and tuning, self-aware and self-adaptive systems, software engineering, service-oriented systems, distributed systems and cloud computing systems.

My PhD thesis focuses on designing self-aware and self-adaptive autoscaling system for cloud-based services where the aim is to dynamically optimize QoS and cost of all services running in the cloud; thus their requirements can be better complied. The main contribution is an autoscaling framework that is capable to 'learn' about its own states and the environment, and adapt itself accordingly. Through using the principle of self-awareness and the related algorithms, autoscaling is achieved without heavy human analysis/intervention and require very limited design time knowledge.

My thesis has addressed specific research questions related to dynamic modeling of non-functional attributes, self-adaptive architecture and trade-off decision making under uncertainty, which can attract interests in the broad category of self-adaptive systems. My future research plan includes further investigation of these research questions, particularly in other domains, e.g., service computing, distributed computing, Internet-of-Things and Big Data.

Education

- Ph.D. from School of Computer Science, University of Birmingham, Birmingham, 2012-2016
  Thesis Title: Self-Aware and Self-Adaptive Autoscaling for Cloud-Based Services
  Supervisor: Dr. Rami Bahsoon
  Area of Study: Systems and Software Engineering

- M.Sc. with distinction from School of Computer Science, University of Birmingham, Birmingham, 2009-2010
  Dissertation Title: Scalable Service-Oriented Replication in the Cloud
  Supervisor: Dr. Rami Bahsoon
  Area of Study: Systems and Software Engineering
  Average Score: overall 74%, 84% for dissertation

- B.Sc. first class from School of Computing, Birmingham City University, Birmingham, 2006-2009
  Area of Study: Systems and Software Engineering
  Average Score: overall 78%, 80% for final project

Teaching Experience

I worked as part-time Teaching Assistant in the School of Computer Science, University of Birmingham.

- Assisted in designing coursework.
- Provided face-to-face feedback to undergraduate and postgraduate students.
- Marked coursework.

Particularly, I was involved in the following modules:

- *Teaching Assistant*: Software Engineering II, 2014-2015 academic year.
- *Teaching Assistant*: Fundamentals on Software Engineering, 2014-2015 academic year.
- *Teaching Assistant*: Software Engineering II, 2013-2014 academic year.
- *Teaching Assistant*: Fundamentals on Software Engineering, 2013-2014 academic year.

Administration Experience

- Engaged in the management for publicity of the Software Engineering Research Group, University of Birmingham.
- Assisted in the organization of workshop with project collaborators.

Research Experience

I was involved in the following research projects:

- *Named Researcher*: Ecology Inspired Self-Aware Autoscaling Supporting Elastic Cloud-Based Services, the project is supported by funding from the Ramsay Research Funding Schema, School of Computer Science, University of Birmingham, 2015.

  - Leaded all the tasks of the whole project.
  - Identified the benefits of ecology for cloud computing.
  - Formulated and modeled the services in cloud using ecological principles.
  - Proposed architecture for ecological cloud computing.

- *Researcher*: Engineering Proprioception in Computing Systems (EPiCS), FP7-ICT-2009-5, the project is supported by funding from the FET proactive initiative "Self-Awareness in Autonomic Systems" by the European Union 7th Framework Programme, 2010-2014.

  - Leaded the task for architecting self-aware systems using self-aware patterns.
  - Categorized the architectural primitives for self-aware systems.
  - Proposed comprehensive methodology to assist in developing self-aware systems.

- *Researcher*: Least Cost Fulfilment, EPSRC KTS (Knowledge Transfer Secondments), 2013.

  - Leaded the task for modeling performance of the cloud-based application.
  - Assisting in determining the demand of cloud resources while minimizing the cost.

Peer-Reviewed Publications

Journal Publications

- **T. Chen** and R. Bahsoon, Self-Adaptive Trade-off Decision Making for Autoscaling Cloud-Based Services, *IEEE Transactions on Services Computing*, 2015, doi:10.1109/TSC.2015.2499770.

- **T. Chen** and R. Bahsoon, Self-Adaptive and Online QoS Modeling for Cloud-Based Software Services, *IEEE Transactions on Software Engineering*, accepted with major revision.

- **T. Chen** and R. Bahsoon, Towards A Smarter Cloud: Self-Aware Autoscaling of Cloud Configurations and Resources, *IEEE Computer*, vol. 48, no. 9, 2015.

- P.R. Lewis, A. Chandra, F. Faniyi, K. Glette, **T. Chen,** R. Bahsoon, J. Torresen and X. Yao, Architectural Aspects of Self-Aware and Self-Expressive Computing Systems: From Psychology to Engineering, *IEEE Computer*, vol. 48, no. 8, 2015.

- **T. Chen**, R. Bahsoon and A-R H. Tawil. Scalable Service-Oriented Replication with Flexible Consistency Guarantee in the Cloud. *Information Sciences*, Elsevier, vol. 264, 2014. (impact factor 3.893)

Conference Publications

- **T. Chen**, R. Bahsoon and X. Yao. Online QoS Modeling in the Cloud: A Hybrid and Adaptive Multi-Learners Approach. In proceeding of the 7th IEEE/ACM International Conference on Utility and Cloud Computing (UCC2014), London, UK. 2014. (acceptance rate 19%)

- **T. Chen** and R. Bahsoon. Symbiotic and Sensitivity-Aware Architecture for Globally-Optimal Benefit in Self-Adaptive Cloud. In proceeding of the 9th International Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), in conjunction with the 36th International Conference on Software Engineering (ICSE), India, 2014. (acceptance rate 22%)

- **T. Chen** and R. Bahsoon. Self-Adaptive and Sensitivity-Aware QoS Modeling for the Cloud. *In proceeding of the 8th International ACM/IEEE Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), in conjunction with the 35th International Conference on Software Engineering (ICSE)*, San Francisco, CA, 2013.(acceptance rate 27%)

- **T. Chen**, R. Bahsoon and G. Theodoropoulos. A Decentralized Architecture for Dynamic QoS Optimization in Cloud-based DDDAS. *In proceeding of International Conference on Computational Science*, Procedia of Computer Science, Elsevier Science, 2013. (acceptance rate 30%)

- **T. Chen** and R. Bahsoon. Scalable Service Oriented Replication in the Cloud. *In proceeding of the 4th IEEE International Conference on Cloud Computing*, Washington D.C., USA, 2011. (acceptance rate 21%)

Book Chapter

- **T. Chen**, F. Faniyi, and R. Bahsoon. Design Patterns and Primitives: Introduction of Components and Patterns for Self-Aware Computing Systems, in the book of Self-Aware Computing Systems, Elsevier, to appear.

Technical Reports

- **T. Chen**, F. Faniyi, R. Bahsoon, P.R. Lewis, X. Yao, L.L. Minku, and L. Esterle. The Handbook of Engineering Self-Aware and Self-Expressive Systems. Technical Report, arXiv:1409.1793 [cs.SE], 2014.

Seminars and Talks

- Talked at seminar of Software Engineering Research Group, University of Birmingham, 2015
- Talked at seminar of Dynamic Adaptive Automated Software Engineering Research Group, University of Birmingham, 2014
- Talked at seminar of Software Engineering Research Group, University of Birmingham, 2014
- Talked at workshop of Engineering Proprioception in Computing Systems, University of Birmingham, 2014
- Talked at seminar of Engineering Proprioception in Computing Systems, University of Birmingham, 2013

Employment History

- *Research Fellow*, Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), School of Computer Science, University of Birmingham, 2016-present.

  - Conducted research in the research projects.
  - Produced scientific results either independently or collaboratively.

- *Research Associate*, School of Computer Science, University of Birmingham, 2013-2015.

  - Leaded tasks in a specific work package of the research projects.
  - Assisted in organizing workshop with collaborators and partners.
  - Worked with partners to write scientific papers.

- *Teaching Assistant*, School of Computer Science, University of Birmingham, 2013-2015.

- Assisted in designing coursework.
- Provided face-to-face feedback to undergraduate and postgraduate students.
- Marked coursework.

- *Software Engineer*, Skillstream Ltd, London, UK, 2011-2012 (full-time), 2012-2013 (part-time).

  - Following on the Scrum agile methodology, I was part of the 'Sprint' team responsible for analyzing users' requirements, developing software service, testing and deploying the system on the geographically distributed infrastructure. I was also involved in debugging and maintenance tasks.

- *Software Engineer,* Summer Internship Program at Pudong Development Bank, Guangxi, China, 2008.
- *Software Engineer*, short-term work-placement at BOAO Ltd, Guangxi, China, 2007.

Professional Activities

- Peer reviewer for the Journal of Systems and Software, Elsevier.
- Peer reviewer for Information Sciences, Elsevier.
- Sub-reviewer for SCC 2014, SCC 2015, ECSA 2015

Funding, Awards and Scholarships

- School of Computer Science, University of Birmingham, Paul and Yuanbi Ramsay Research Funding Award.
- ACM Special Interest Group on Software Engineering's (SIGSOFT) outstanding researcher award, 2014.
- ACM Special Interest Group on Software Engineering's (SIGSOFT) outstanding researcher award, 2013.
- School of Computer Science, fully-funded University of Birmingham Ph.D. scholarship, 2012.
- School of Computer Science, University of Birmingham outstanding M.Sc. student scholarship, 2009.
- School of Computing, Birmingham City University best international undergraduate student award and scholarship, 2006.

Technical Proficiency

Programming and Frameworks: Java, Javascript, Shell script, Actionscript, Flex, HTML, SQL, J2EE, JDBC, Hibernate, Structs, Velocity, Wicket, Spring, Liquidbase, Axis2, Encog, Latex
Software and Virtualization: Xen, Tomcat, MySQL, PostgresSQL, Oracle, Apache
Software Development Control and Management: SVN, Git, Ant, Maven, Jenkins
Methodology and Analytical Notations: UML, Scrum, Database Analytics, ATAM