Tao Chen

Curriculum Vitae

Department of Computer Science
Loughborough University
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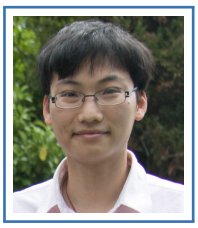

Research Interests

My research has been on *Software Engineering*, including but not limited to, *Performance Engineering*, *Search-based Software Engineering*, *Self-* Software Systems*, *Cloud Computing* and *Services Computing*. Most of my work lies in the synergy between *Computational Intelligence* (e.g., *Natural Computation* and *Machine Learning*) and *Software Engineering*, with a focus on exploiting and tailoring Computational Intelligence for understanding, improving and assessing the software engineering process as well as the runtime behaviors of the developed software systems. The ultimate goal of my work is to establish approaches that enable intuitive and effective creation of more dependable, reliable and truly self-adaptive software systems.

Qualifications

2012–2016 **Ph.D.**, *School of Computer Science, University of Birmingham*, Birmingham, UK.
Thesis Title: Self-Aware and Self-Adaptive Autoscaling for Cloud-Based Services
Area of Study: Computational Intelligence, Systems and Software Engineering

2009–2010 **M.Sc.**, *School of Computer Science, University of Birmingham*, Birmingham, UK, *Distinction*.
Dissertation Title: Scalable Service-Oriented Replication in the Cloud
Area of Study: Systems and Software Engineering

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

Certificate

2018 **AFHEA**, *Associate Fellow of Higher Education Academy*, UK.

Research Positions

2019 Aug –present **Lecturer (Assistant Professor)**, *Department of Computer Science, Loughborough University*, Loughborough, UK.

2017 Nov –2019 Aug **Lecturer (Assistant Professor)**, *Department of Computing and Technology, College of Science and Technology, Nottingham Trent University*, Nottingham, UK.

2017 Nov –present **Honorary Research Fellow**, *Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), School of Computer Science, University of Birmingham*, Birmingham, UK.

2016 Jan –2017 Nov **Research Fellow**, *Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), School of Computer Science, University of Birmingham*, Birmingham, UK.

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

Industrial Experience

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

2008 **Software Engineer (Internship)**, *Pudong Development Bank*, China.

2007 **Software Engineer (Internship)**, *BOAO Ltd*, China.

Research Projects

2019–2020 **Principal investigator**, *Evolutionary Optimization for Self-Adaptive Software Systems*, £2,188 funded by NTU B11 REF Grant.

2019–2020 **Principal investigator**, *Automated Profiler for Adaptive Systems in IoT*, £3,465 funded by RISE, Germany.

2016–2018 **Researcher (theme leader)**, *Dynamic Adaptive Automated Software Engineering (DAASE)*, Grant No. EP/J017515/1, £6,834,903 funded by EPSRC.

2015–2016 **Co-principal investigator**, *Ecology Inspired Self-Aware Autoscaling Supporting Elastic Cloud-Based Services*, £8,000 funded by Ramsay Research Funding Schema, School of Computer Science, University of Birmingham.

2014–2015 **Researcher**, *Engineering Proprioception in Computing Systems (EPiCS)*, Grant No. FP7-ICT-2009-5, €681,385 funded by the FET proactive initiative "Self-Awareness in Autonomic Systems" by the European Union 7th Framework Programme.

2013 **Researcher**, *Least Cost Fulfilment*, £26,415 funded by EPSRC KTS (Knowledge Transfer Secondments).

Refereed Publications

Journal Articles (* denotes corresponding author;+ denotes student under my supervision)

Elsevier IST **T. Chen***, M. Li, and X.Yao. Standing on the Shoulders of Giants: Seeding Search-based Multi-Objective Optimization with Prior Knowledge for Software Service Composition, Elsevier Information and Software Technology, vol. 114, 2019. [overall JSR rating: **Q1**]

ACM TOSEM **T. Chen***, K. Li, R. Bahsoon and X.Yao. FEMOSAA: Feature Guided and Knee Driven Multi-Objective Optimization for Self-Adaptive Software, ACM Transactions on Software Engineering and Methodology, vol. 27, no. 2, 2018. (The most popular article in ACM Transactions on Software Engineering and Methodology Aug 2018) [overall JSR rating: **Q1**]

ACM CSUR **T. Chen***, R. Bahsoon and X.Yao. A Survey and Taxonomy of Self-Aware and Self-Adaptive Cloud Autoscaling Systems, ACM Computing Surveys, vol. 51, no. 3, 2018. [overall JSR rating: **Q1**]

IEEE TSE **T. Chen*** and R. Bahsoon. Self-Adaptive and Online QoS Modeling for Cloud-Based Software Services, IEEE Transactions on Software Engineering, vol. 43, no. 5, 2017. (Top 5 most popular article in IEEE Transactions on Software Engineering 2017) [overall JSR rating: **Q1**]

IEEE TSC **T. Chen*** and R. Bahsoon. Self-Adaptive Trade-off Decision Making for Autoscaling Cloud-Based Services, IEEE Transactions on Services Computing, vol. 10, no. 4, 2017. (Top 50 most popular article in IEEE Transactions on Services Computing 2017) [overall JSR rating: **Q1**]

IEEE COM **T. Chen*** and R. Bahsoon. Towards A Smarter Cloud: Self-Aware Autoscaling of Cloud Configurations and Resources, IEEE Computer, vol. 48, no. 9, 2015. [overall JSR rating: **Q2**]

IEEE COM 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. [overall JSR rating: **Q2**]

Elsevier INS **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. [overall JSR rating: **Q1**]

Conference Proceedings

ICWS 2019 S. Kumar+, R.Bahsoon, **T. Chen**, and R. Buyya. Identifying and Estimating Technical Debt for Service Composition in SaaS Cloud. In proceeding of the IEEE International Conference on Web Services (ICWS), Milan, Italy. 2019. (CORE rating: **A**)

GECCO 2019 M. Liu+, K. Li and **T. Chen**. Security Testing of Web Applications: A Search-Based Approach for Detecting SQL Injection Vulnerabilities. In proceeding of the 21st ACM International Genetic and Evolutionary Computation Conference (GECCO 2019), Prague, Czech Republic. 2019. (CORE rating: **A**, acceptance rate 25%)

ICSE/SEAMS 2019 **T. Chen**. All Versus One: An Empirical Comparison on Retrained and Incremental Machine Learning for Modeling Performance of Adaptable Software. In proceeding of the 14th International ACM/IEEE Symposium on Software Engineering for Adaptive and Self-Managing Systems (SEAMS), co-located with ICSE 2019, Montreal, Canada, 2019. (**2nd** on Google Metric adaptive systems category, acceptance rate 20%)

GECCO 2018 **T. Chen**, M. Li and X.Yao. On the Effects of Seeding Strategies: A Case for Search-based Multi-Objective Service Composition. In proceeding of the 20th ACM International Genetic and Evolutionary Computation Conference (GECCO 2018), Kyoto, Japan. 2018. (CORE rating: **A**, acceptance rate 29%)

ICSE 2018 M. Li, **T. Chen** and X.Yao. A Critical Review of A Practical Guide to Select Quality Indicators for Assessing Pareto-Based Search Algorithms in Search-Based Software Engineering: Essay on Quality Indicator Selection for SBSE. In proceeding of the 40th IEEE/ACM International Conference on Software Engineering (ICSE 2018), NIER Track, Gothenburg, Sweden. 2018. (CORE rating: **A***, acceptance rate 18%)

ICPE 2018 **T. Chen**, R. Bahsoon, S. Wang and X.Yao. To Adapt or Not to Adapt: Technical Debt Driven Runtime Adaptation for Self-Adaptive Software. In proceeding of the 9th ACM/SPEC International Conference on Performance Engineering (ICPE), Berlin, Germany, 2018. (**2nd** on Google Metric performance engineering category, acceptance rate 21%)

ICPADS 2018 S. Kumar^{+}, R.Bahsoon, **T. Chen**, K. Li and R. Buyya. Multi-Tenant Cloud Service Composition using Evolutionary Optimization. In proceeding of the 24th IEEE International Conference on Parallel and Distributed Systems (ICPADS 2018), Singapore. 2018. (CORE rating: **B**)

UCC 2014 **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. (**7th** on Google Metric cloud computing category, acceptance rate 19%)

SEAMS 2014 **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), India, 2014. (**2nd** on Google Metric adaptive systems category, acceptance rate 22%)

SEAMS 2013 **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), San Francisco, CA, 2013.(**2nd** on Google Metric adaptive systems category, acceptance rate 27%)

ICCS 2013 **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. (CORE rating: **A**, acceptance rate 30%)

IEEE CLOUD 2011 **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. (CORE rating: **B**, acceptance rate 21%)

Book Chapters

T. Chen and R. Bahsoon. Bridging Ecology and Cloud: Transposing Ecological Perspective to Enable Better Cloud Autoscaling, in the book of Software Architecture for Big Data and the Cloud, Morgan Kaufmann, 2017.

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, 2016.

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.

Teaching Experience

Academic Supervision

2018 Min Duc Chong, Comparative Study of Machine Learning Algorithms for Software Performance Prediction in the Cloud, M.Sc. in Computing Systems

2018 Evan Harvely, On the Termination Criteria of Evolutionary Search-Based Algorithms for Cloud Resources Management, M.Sc. in Computing Systems

2017–present Dalia Sobhy, Economic and Machine Learning Driven Self-Adaptive Architecture Diversity in IoT, Ph.D. in Software Engineering and Computer Science (co-supervised with Dr. Rami Bahsoon)

2017–present Satish Kumar, Evolutionary Multi-Tenanted Service Composition at SaaS, Ph.D. in Software Engineering and Computer Science (co-supervised with Dr. Rami Bahsoon)

2017 Taiyang Guo, Cloud Instance Selection using Parallel K-Mean Clustering and Hadoop, M.Sc. in Advanced Computer Science

2016–present Carlos Joseph Mera Gomez, Technical Debt Models for the Cloud, Ph.D. in Software Engineering and Computer Science (co-supervised with Dr. Rami Bahsoon)

2016 Marcus Chon Kit Ng, Multi Populations with Dynamic Diversity Levels for Dynamic Optimization, M.Sc. in Advanced Computer Science (co-supervised with Prof. Xin Yao)

Lecturing

2019–2020 Industry Insights (undergraduate students)

2017–2019 Software Engineering II (postgraduate students)

2017–2019 Software Design and Implementations (undergraduate students)

2014–2015 Software Engineering II (postgraduate students)

2014–2015 Fundamental Software Engineering (undergraduate and postgraduate students)

2013–2014 Software Engineering II (postgraduate students)

2013–2014 Fundamental Software Engineering (undergraduate and postgraduate students)

Administration Experience

Research Committee Member

2017
- Voted on funding applications for Research Committee funds.
- Discussed research issues during committee meetings.

Publicity Chair of SE group/EU project

2013–2016
- Engaged in the management for publicity of the Software Engineering Research Group, University of Birmingham.
- Assisted in the organization of workshop with project collaborators.

Selected Talks

2019 Invited talk at seminar of Software Engineering Research Group, University of Birmingham

2017 Invited talk at DAASE project meeting, University of Sheffield

2016 Invited talk at seminar of School of Computing and Communication, Lancaster University

2015 Invited talk at seminar of Software Engineering Research Group, University of Birmingham

2014 Invited talk at seminar of EPSRC project: Dynamic Adaptive Automated Software Engineering, University of Birmingham

2014 Invited talk at seminar of Software Engineering Research Group, University of Birmingham

2014 Invited talk at workshop of EU project: Engineering Proprioception in Computing Systems, Botanic Garden, Birmingham

2013 Invited talk at seminar of EU project: Engineering Proprioception in Computing Systems, University of Birmingham

Grants, Awards and Scholarships

2019 Nottingham Trent University, B11 REF Award (£2,188).

2019 Research Internships in Science and Engineering Grant, Germany (£3,465).

2015 School of Computer Science, University of Birmingham, Paul and Yuanbi Ramsay Research Grant (£8,000).

2014 ACM Special Interest Group on Software Engineering's (SIGSOFT) outstanding student researcher travel award (£630).

2013 ACM Special Interest Group on Software Engineering's (SIGSOFT) outstanding student researcher travel award (£527).

2012 School of Computer Science, fully-funded University of Birmingham Ph.D. scholarship for international students. (selecting only one student each year to fund £28,210 per annum for three years)

2009 School of Computer Science, University of Birmingham outstanding M.Sc. student scholarship (£3,000).

2006 School of Computing, Birmingham City University best international undergraduate student award and scholarship (£9,000).

Professional Services

Memberships

2013–now IEEE member

2014–now ACM member

Editorial Board Member

Services Transactions on Internet of Things (STIOT)

PC member

International Workshop on Intelligent Software Engineering, 2019

Artifact Track, ACM/IEEE International Conference on Software Engineering, 2019

International Conference on Cognitive Computing, 2019

IEEE International Congress on Internet of Things, 2019

International Conference on Cognitive Computing, 2018

IEEE International Congress on Internet of Things, 2018

IEEE World Congress on Services, 2018

Student Research Competition, ACM SIGAPP Symposium On Applied Computing, 2018

ACM SIGAPP Symposium On Applied Computing, 2017

IEEE World Congress on Services, 2017

S2 International Conference on Internet of Things, 2016

IEEE Services 2016 Emerging Track: Big Data Software Engineering for Cloud, Edge Computing and Mobility

Regular Reviewer of Journals (Selected)

IEEE Transactions on Services Computing

ACM Transactions on Software Engineering and Methodology

IEEE Transactions on Evolutionary Computation

IEEE Software

Elsevier Journal of Systems and Software

Elsevier Information Sciences

ACM Computing Surveys

Elsevier Future Generation Computer Systems

Reviewer of Conference (Selected)

IEEE International Conference on Big Data, 2016

International Conference on Services Computing, 2015

European Conference on Software Architecture, 2015

International Conference on Services Computing, 2014

Technical Proficiency

Programming and Frameworks

Java, C++, C# , Javascript, Shell script, Actionscript, Flex, HTML, SQL, J2EE, JDBC, Hibernate, Structs, Velocity, Wicket, Spring, Liquidbase, Axis2, Encog, LaTeX

Software and Virtualization

Xen, Apache Tomcat, MySQL, PostgresSQL, Oracle, Apache

Software Development Control and Management

SVN, Git, Ant, Maven, Jenkins

Methodology and Analytical Notations

UML, Scrum, Database Analytics, ATAM

References

References are available upon request.