

# Tao Chen

## Curriculum Vitae

CERCIA, School of Computer Science  
University of Birmingham  
Edgbaston, Birmingham, B15 2TT, UK

☎ +44 07768279822

☎ +44 (0)121 414 3734

✉ t.chen@cs.bham.ac.uk

🌐 www.cs.bham.ac.uk/~chentx/



### 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 has been on *Software Engineering*, including but not limited to, *Performance Engineering*, *Search-based Software Engineering*, *Cloud Computing* and *Services Computing*. I am particularly interested in engineering *Self-Adaptive Software Systems*, understanding their runtime behaviors and applying them in cloud-based, service-oriented and distributed environment. Most of my work leverages *Natural Computation*, *Machine Learning* and *Economic Theory* to tackle the problems (please see my publications for details).

### Education

- 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: 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

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## Employment History

### Vocational

- 2016–present **Research Fellow**, *Centre of Excellence for Research in Computational Intelligence and Applications (CERCIA), School of Computer Science, University of Birmingham, Birmingham.*
- Conducted research in the research projects.
  - Produced scientific results either independently or collaboratively.
- 2013–2015 **Research Associate**, *School of Computer Science, University of Birmingham, Birmingham.*
- Led 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.
- 2013–2015 **Teaching Assistant**, *School of Computer Science, University of Birmingham, Birmingham.*
- Assisted in designing coursework.
  - Provided questions/answers sessions to undergraduate and postgraduate students.
  - Marked coursework.
- 2011–2012 **Software Engineer**, *Skillstream Ltd, London.*
- (full 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.
- 2012–2013 (part time)

### Internship

- 2008 **Software Engineer**, *Pudong Development Bank, China.*
- 2007 **Software Engineer**, *BOAO Ltd, China.*

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## Research Experience

- 2016–present **Researcher (theme leader)**, *Dynamic Adaptive Automated Software Engineering (DAASE), Grant No. EP/J017515/1, £6,834,903 funded by EPSRC.*
- Investigated effective optimization and modeling approaches for self-adaptive software systems.
  - Created synergy between software engineering and computational intelligence.
- 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.*
- Led 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.
- 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.*
- Led 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.

- 2013 **Researcher**, *Least Cost Fulfilment*, £26,415 funded by EPSRC KTS (Knowledge Transfer Secondments).
- Led the task for modeling performance of the cloud-based application.
  - Assisting in determining the demand of cloud resources while minimizing the cost.

## Refereed Publications

### Journal Articles

- 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)
- TSC **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.
- 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.
- 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.
- 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.

### Conference Proceedings

- 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. (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), in conjunction with the 36th International Conference on Software Engineering (ICSE), India, 2014. (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), in conjunction with the 35th International Conference on Software Engineering (ICSE), San Francisco, CA, 2013.(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. (acceptance rate 30%)
- IEEE CLOUD **T. Chen** and R. Bahsoon. Scalable Service Oriented Replication in the Cloud. 2011 In proceeding of the 4th IEEE International Conference on Cloud Computing, Washington D.C., USA, 2011. (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** and R. Bahsoon. Survey and Taxonomy of Self-Aware and Self-Adaptive Autoscaling Systems in the Cloud. Technical Report, arXiv:1609.03590 [cs.SE], 2016.

**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.

### Submitted for Publication

**T. Chen**, K. Li, R. Bahsoon and X.Yao. FEMOSAA: Feature Guided and Knee Driven Multi-Objective Optimization for Self-Adaptive Software at Runtime.

**T. Chen**, S. Wang, R. Bahsoon and X.Yao. To Adapt or Not to Adapt: Technical Debt Driven Runtime Adaptation for Self-Adaptive Software.

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## Teaching Experience

### Academic Supervision

- 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)

### Lecture Assisting

- 2014–2015 Software Engineering II (postgraduate students)
- 2014–2015 Fundamental Software Engineering II (undergraduate and postgraduate students)
- 2013–2014 Software Engineering II (postgraduate students)
- 2013–2014 Fundamental Software Engineering II (undergraduate and postgraduate students)

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## Administration Experience

### Research Committee Member

- 2017–present
- 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.

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## Selected Talks

- 2016 Invited talk at seminar of School of Computing and Communication, Lancaster University
- 2015 Talk at seminar of Software Engineering Research Group, University of Birmingham
- 2014 Talk at seminar of EPSRC project: Dynamic Adaptive Automated Software Engineering, University of Birmingham
- 2014 Talk at seminar of Software Engineering Research Group, University of Birmingham
- 2014 Talk at workshop of EU project: Engineering Proprioception in Computing Systems, Botanic Garden, Birmingham
- 2013 Talk at seminar of EU project: Engineering Proprioception in Computing Systems, University of Birmingham

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## Grants, Awards and Scholarships

- 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).

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## Professional Services

### Memberships

- 2013–2016 IEEE student member

2016–now IEEE member

2013–2016 ACM student member

#### [Editorial Board Member/Reviewer of Journals](#)

Journal of Systems and Software

Information Sciences

Services Transactions on Internet of Things (STIOT)

#### [PC member/Reviewer of Conferences](#)

IEEE World Congress on Services, 2017

S2 International Conference on Internet of Things, 2016

IEEE International Conference on Big Data, 2016

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

International Conference on Services Computing, 2015

European Conference on Software Architecture, 2015

International Conference on Services Computing, 2014

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## Technical Proficiency

### [Programming and Frameworks](#)

Java, Javascript, Shell script, Actionscript, Flex, HTML, SQL, J2EE, JDBC, Hibernate, Struts, Velocity, Wicket, Spring, Liquidbase, Axis2, Encog,  $\LaTeX$

### [Software and Virtualization](#)

Xen, Apache Tomcat, MySQL, PostgreSQL, Oracle, Apache

### [Software Development Control and Management](#)

SVN, Git, Ant, Maven, Jenkins

### [Methodology and Analytical Notations](#)

UML, Scrum, Database Analytics, ATAM

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## References

### **Rami Bahsoon.**

Senior Lecturer

School of Computer Science, University of Birmingham

Phone: +44 (0) 121 414 4770 | Email: r.bahsoon@cs.bham.ac.uk

### **Xin Yao.**

Professor

School of Computer Science, University of Birmingham

Phone: +44 (0) 121 414 3747 | Email: x.yao@cs.bham.ac.uk

### **Mirco Musolesi.**

Reader

Department of Geography, University College London

Phone: +44 (0) 207 679 0567 | Email: m.musolesi@ucl.ac.uk