Dr. Jiamou Liu

Current Address:
Department of Computer Science
The University of Auckland
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Date of Birth: February 24, 1983
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Permanent Residency: New Zealand

Research Interests

My research lies in the intersection between theoretical computer science and artificial intelligence. In particular, I am interested in the interdisciplinary area of multi-agent systems and social network analysis. My main research activities involve exploring the algorithmic and mathematical aspects of social networks; topics of interests include interpersonal ties, influence, communities structures, game-theoretical models, information diffusion, and social cohesion. I am also interested in pure and applied aspects of logic, algorithmic model theory, computational complexity and automata theory.

Education

PhD, Computer Science, University of Auckland, New Zealand 2006 - 2010

Visiting graduate student Cornell University, USA August 2008 - December 2008
August 2007 - December 2007
August 2005 - December 2005

Visiting student, National University of Singapore (NUS), Singapore 2006

BSc(Honours) First Class, Computer Science and Mathematics, University of Auckland, New Zealand 2002 - 2005

Employment

Lecturer Febuary 2016 – Now
Department of Computer Science
The University of Auckland, Auckland, New Zealand

Senior Lecturer in Computer Science January 2013 – January 2015
Lecturer in Computer Science February 2011 – December 2012
School of Computer and Mathematical Sciences
Auckland University of Technology (AUT), Auckland, New Zealand

Invited Researcher January 2013 – July 2013
Laboratoire d'Informatique Algorithmique: Fondements et Applications
Université Paris Diderot – Paris 7, Paris, France

PostDoc Fellow June 2009 - December 2010
Funded by the DFG research project GELO (Graphen mit entscheidbaren Logiken)
Abteilung Algebraische und logische Grundlagen der Informatik (headed by Prof. Markus Lohrey)
Institut für Informatik, Universität Leipzig, Leipzig, Germany

Research Intern February 2008 - May 2008
Theory Group, Microsoft Research Asia, Beijing, China

Research Grants and Awards

Modeling and simulation of social network evolution - an AI perspective 2016–2018
FRDF New Staff, Faculty of Science, The University of Auckland NZ$30,000

Games and Automaticity 2012–2015
AUT1101 Royal Society of New Zealand Marsden Fund Start Up NZ$331,237

Mid-Career Research Development Fund 2015-2017
DCT Faculty, AUT NZ$50,000

Vice-Chancellor's Award for Excellence in Teaching (Highly Commended) 2014
DCT Faculty Learning and Teaching Award 2013
Vice-Chancellor's Award for Excellence in Research (Emerging Researcher) 2012
Auckland University of Technology

Leibniz fellowship (for the workshop on computability) 2012
Mathematisches Forschungsinstitut Oberwolfach, Germany

New Zealand International Doctoral Research Scholarship 2006–2009
Education New Zealand

Microsoft Research Asia Fellowship 2007–2008
Microsoft Research Asia, Beijing, China

Publication

Fully refereed papers in international journal

[1] **J. Liu**, A. Moskvina, *Hierarchies, Ties and Power in Organizational Networks: Model and Analysis*. Social Network Analysis and Mining 6(1): 106:1-106:26. Springer 2016

[2] A. Gavruskin, B. Khoussainov, M. Kokho, **J. Liu**, *Dynamic Algorithms for Multimachine Interval Scheduling Through Analysis of Idle Intervals*. Algorithmica. Apr.: 1-21. Springer 2016

[3] A. Gavruskin, B. Khoussainov, M. Kokho, **J. Liu**, *Dynamic algorithms for monotonic interval scheduling problem*. Theoretical Computer Science. 562: 227-242. Elsevier. 2015.

[4] D. Kuske, **J. Liu**, M. Lohrey, *The isomorphism problem on classes of automatic structures with transitive relations*, Transactions of the American Mathematical Society 365: 5103-5151. AMS. 2013.

[5] D. Kuske, **J. Liu**, M. Lohrey, *The Isomorphism Problem on ω-Automatic Trees*, Annals of Pure and Applied Logic 164: 30–48, Elsevier. 2013.

[6] M. Huschenbett, A. Kartzow, **J. Liu**, M. Lohrey, *Tree-Automatic Well-Founded Trees*. Logical Methods in Computer Science 9(2). 2013.

[7] **J. Liu**, M. Minnes, *Deciding the Isomorphism Problem on Classes of Unary Automatic Structures*, Theoretical Computer Science 412(18): 1705–1717. Elsevier. 2011.

[8] A. Gandhi, B. Khoussainov, **J. Liu**, *Efficient Algorithms for Games Played on Trees with Back-edges*, Fundamenta Informaticae 111(4): 391–412. IOS Press. 2011.

[9] B. Khoussainov, **J. Liu**, M. Minnes, *Unary Automatic Graphs: An Algorithmic Approach*, the Journal of Mathematical Structures in Computer Science, 19:133–152. Cambridge University Press. 2009.

[10] B. Khoussainov, **J. Liu**, *On Complexity of Ehrenfeucht-Fraïssé Games*, Annals of Pure and Applied Logic, vol 161(3): 404–415, Elsevier. 2009.

Book chapters

[11] **J. Liu**, Z. Wei, Q. Bai, *Simulating and Modeling Dual Market Segmentation Using PSA*, Multi-agent and Complex Systems (Bai, Q., Ren, F., Fujita, K., Zhang, M., Ito, T. (Eds.)), Studies in Computational Intelligence, Vol 670, Springer, 2017.

[12] **J. Liu**, A. Moskvina, M. Ourednik, *CORPNET: Towards a Decision Support System for Organizational Network Analysis Using Multiplex Interpersonal Relations*, Multi-agent and Complex Systems (Bai, Q., Ren, F., Fujita, K., Zhang, M., Ito, T. (Eds.)), Studies in Computational Intelligence, Vol 670, Springer, 2017.

[13] **J. Liu**, Z. Wei, *Agent-Based Computation of Decomposition Games with Application in Software Requirements Decomposition*, Multi-agent and Complex Systems (Bai, Q., Ren, F., Fujita, K., Zhang, M., Ito, T. (Eds.)), Studies in Computational Intelligence, Vol 670, Springer, 2017.

Fully refereed papers in international conferences and workshops

[14] **J. Liu**, Z. Wei, *Network, Popularity and Social Cohesion: A Game-Theoretic Approach*. Proceedings of the Thirty-First AAAI Conference on Artificial Intelligence (AAAI-17), San Francisco, USA, 2017.

[15] **J. Liu**, L. Li, K. Russell, *What Becomes of the Broken Hearted? – An Agent-Based Approach to Self-Evaluation, Interpersonal Loss, and Suicide Ideation*. Proceedings of the Sixteenth International Conference on Autonomous Agents and Multiagent Systems (AAMAS-17), Sao Paulo, Brazil, 2017.

[16] C. Yang, B. Yan, **J. Liu**, *Dynamic Relationship Building: Exploitation Versus Exploration on a Social Network*. Proceedings of the The 18th International Conference on Web Information Systems Engineering (WISE-17), Moscow, Russia, 2017.

[17] **J. Liu**, Y. Tao, Z. Wei, *From Secrete Admirer to Cyberstalker A Measure of Online Interpersonal Surveillance*. Proceedings of the 2017 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM-17), Sydney, Australia, 2017.

[18] L. Ni, C. Lu, N. Liu, **J. Liu**, *MANDY: Towards A Smart Primary Care Chatbot Application*. Proceedings of the 18th International Symposium on Knowledge and Systems Sciences (KSS-17), Bangkok, Thailand, 2017.

[19] Y. Tao, Q. Bai, **J. Liu**, *Detecting Abnormal Attention in Online Social Networks from Local Views*. Proceedings of the 2nd IEEE International Conference on Agents (ICA-17), Beijing, China, 2017.

[20] F. Yang, H. Wang, Y. Tang, **J. Liu**, W. Chen, *A Consensus-Value Approach for Influence Maximization in Social Networks*. Proceedings of the 2nd IEEE International Conference on Agents (ICA-17), Beijing, China, 2017.

[21] A. Moskvina, **J. Liu**, *How to Build Your Network: A Structural Analysis*. Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI-16), pp: 2597–2603. New York. AAAI Press, 2016.

[22] A. Moskvina, **J. Liu**, *Togetherness: An Algorithmic Approach to Network Integration*. Proceedings of thee IEEE/ACM International Conference on Advances in Social Networks Analysis

and Mining (ASONAM 2016, Full paper), San Francisco, USA. 2016.

[23] **J. Liu**, Y. Tao, Q. Bai, *Towards Exposing Stalkers on the Cyberspace (Extended Abstract).* Proceedings of the 14th Pacific-Rim International Conference on Artificial Intelligence (PRICAI 2016), Phuket, Thailand. 2016

[24] A. Moskvina, **J. Liu**, *Integrating Networks of Equipotent Nodes.* Proceedings of the 5th International Conference on Computational Social Networks (CsoNet 2016), Ho Chi Minh City, Vietnam. LNCS 9795:39–50, Springer, 2016

[25] B. Khoussainov, **J. Liu**, *Decision Problems for Finite Automata over Infinite Algebraic Structures.* Proceedings of the 21st International Conference on Implementation and Application of Automata (CIAA 2016), Seoul, South Korea. LNCS 9705:3–11, Springer, 2016.

[26] Z. Wei, **J. Liu**, *Measuring Structural Resilience Through a Carrier Network Model.* Proceedings of CyberSciTech 2016, Auckland, New Zealand. IEEE Computer Society. 2016

[27] **J. Liu**, A. Moskvina, *Hierarchies, Ties and Power in Organisational Networks: Model and Analysis.* Proceedings of the 2015 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (ASONAM 2015), Paris. ACM, 2015.

[28] **J. Liu**, Z. Wei, *A Game of Attribute Decomposition for Software Architecture Design.* Proceedings of the 12th International Colloquium on Theoretical Aspects of Computing (ICTAC 2015), Cali, Columbia. LNCS 9399:445–463, Springer. 2015.

[29] Q. Bai, **J. Liu**, Z. Wei, *Modeling and Simulation of Market Segmentation Based on PSA Framework.* Proceedings of the Second International Workshop on Smart Simulation and Modeling for Complex Systems (SSMCS 2015), to be held in conjunction with IJCAI 2015, Argentina, 2015.

[30] **J. Liu**, A. Moskvina, M. Ourednik, *CorpNet: Towards a Decision Support System for Organizational Network Analysis using Multiplex Interpersonal Relations.* Proceedings of the Second International Workshop on Smart Simulation and Modeling for Complex Systems (SSMCS 2015), to be held in conjunction with IJCAI 2015, Argentina, 2015.

[31] D. Kuske, **J. Liu**, A. Moskvina, *Infinite and Bi-infinite Words with Decidable Monadic Theories.* Proceedings of the 24th EACSL Annual conference on Computer Science Logic (CSL 2015), Berlin, 2015.

[32] **J. Liu**, Z. Wei, *From a Local to a Global Perspective of Community Detection in Networks*, Trends in Artificial Intelligence – Proceedings of the 13th Pacific Rim International Conference on Artificial Intelligence (PRICAI 2014), Australia, LNCS 8862: 1036–1049, Springer. 2014.

[33] **J. Liu**, Z. Wei, *Community Detection Based on Graph Dynamical Systems with Asynchronous Runs*, Proceedings of the Second International Symposium on Computing and Networking, (CANDAR 2014), Japan, pp: 463–469. IEEE. 2014.

[34] A. Gavruskin, B. Khoussainov, M. Kokho, **J. Liu**, *Dynamic Interval Scheduling for Multiple Machines*, Proceedings of the 25th International Symposium on Algorithms and Computation (ISAAC 2014), Korea, LNCS 8889: 235–246, Springer. 2014.

[35] M. Huschenbett, **J. Liu**, *A Polychromatic Ramsey Theory for Ordinals*, Proceedings of the 38th International Symposium on Mathematical Foundations of Computer Science (MFCS 2013), Austria, LNCS 8087: 559–570, Springer. 2013

[36] A. Gavruskin, B. Khoussainov, M. Kokho, **J. Liu**, *Dynamising Interval Scheduling: The Monotonic Case*, Revised Selected Papers of 24th International Workshop on Combinatorial Algorithms (IWOCA 2013), France, LNCS 8288: 178–191, Springer. 2013.

[37] A. Kartzow, **J. Liu**, M. Lohrey, *Tree-automatic well-founded trees*, Proceedings of the 8th Conference on Computability in Europe (CiE 2012), Cambridge, UK. LNCS 7318: 363–373, Springer. 2012.

[38] A. Gandhi, B. Khoussainov, **J. Liu**, *Finite Automata on Structures*, Proceedings of 9th annual conference on Theory and Applications of Models of Computation (TAMC 2012), Beijing, LNCS 7287: 373–384, Springer. 2012.

[39] A. Gandhi, B. Khoussainov, **J. Liu**, *On state complexity of finite word and tree languages*, Proceedings of the 16th International Conference on Developments in Language Theory (DLT 2012), Taipei, LNCS 7410: 392–403, Springer. 2012.

[40] A. Gandhi, B. Khoussainov, **J. Liu**, *Solving Infinite Games on Trees with Back-edges*, Proceedings of Computing: The Australasian Theory Symposium (CATS 2012), Melbourne, Australia. CRPIT, 128. Mestre, J. Eds., ACS. 113-122. 2012.

[41] I. Khaliq, B. Khoussainov, **J. Liu**, *Extracting Strategies for Update Games*, Proceedings of the 7th Conference on Computability in Europe (CiE 2011), Bulgaria, LNCS 6735: 142–151, Springer. 2011.

[42] D. Kuske, **J. Liu**, M. Lohrey, *The Isomorphism Problem for ω-Automatic Trees*, Proceedings of the 19th EACSL Annual Conferences on Computer Science Logic (CSL 2010), Czech, LNCS 6247:396–410, Springer. 2010.

[43] D. Kuske, **J. Liu**, M. Lohrey, *The Isomorphism Problem on Classes of Automatic Structures*, Proceedings of the 25th IEEE Symposium on Logic in Computer Science (LICS 2010), 160–169. IEEE Computer Society. 2010.

[44] B. Khoussainov, **J. Liu**, I. Khaliq, *A Dynamic Algorithm for Reachability Games on Trees*, Proceedings of the 24th International Symposium of Mathematical Foundations of Computer Science (MFCS 2009), Slovakia, LNCS 5734:518-529, Springer. 2009.

[45] **J. Liu**, M. Minnes, *Analysing Complexity in Classes of Unary Automatic Structures*, Proceedings of the 3rd International Conference on Language and Automata Theory and Applications (LATA 2009), Spain, LNCS 5457:518-529, Springer. 2009.

[46] **J. Liu**, T. Zhang, *Combining Dense Linear Order with Random Graphs*, Proceedings of CEDAR 2008, 4th International Joint Conference on Automated Reasoning (IJCAR 2008), pp:63–71, Sydney, Australia. 2008.

[47] B. Csima, B. Khoussainov, **J. Liu**, *Computable Categoricity of Graphs with Finite Components*, Proceedings of the 4th Conference on Computability in Europe (CiE 2008), LNCS 5028:139–148, Springer. 2008.

[48] B. Khoussainov, **J. Liu**, M. Minnes, *Unary Automatic Graphs: An Algorithmic Approach*, Proceedings of the 5th International Conference of Theory and Applications of Models of Computation (TAMC 2008), Xi'An, China, LNCS 4978:542–553, Springer. 2008.

[49] B. Khoussainov, **J. Liu**, *On Complexity of Ehrenfeucht-Fraïssé Games*, Proceeding of the International Symposium on Logical Foundations of Computer Science (LFCS 2007), New York, LNCS 4514:293–309, Springer. 2007.

Abstracts presented in international conferences and workshops

[50] **J. Liu**, *The Ramsey Degrees of Ordinals Below ω^ω*, Computability in Europe 2014.

[51] **J. Liu**, *An Automata Model for Computations Over an Arbitrary Structure*, Computability in Europe 2013.

[52] **J. Liu**, *The Isomorphism Problem on Automatic Linear Orders and Trees*, Logic Colloquium 2011, Association for Symbolic Logic, Barcelona, 2011.

[53] M. Lohrey, D. Kuske, **J. Liu**, *The Isomorphism on Classes of Automatic Structures*, Logical Approaches to Barriers in Computing and Complexity (Greifswald 2010), Greifswald 2010.

Teaching and Supervision

Courses taught at the University of Auckland

COMPSCI767 Autonomous and Intelligent Agents (Year 4)
COMPSCI367 Artificial Intelligence (Year 3)
MATHS315 Mathematical Logic (Year 3)
COMPSCI225 Discrete Structures in Mathematics and Computer Science (Year 2)

Courses developed and taught at AUT

715189 Algebra and Discrete Mathematics (Year 1)
716180 Data Structures and Algorithm (Year 2)
716181 Algorithm Design and Analysis (Year 2)
Math600 Logic and Discrete Structures (Year 2)
717300 Theory of Computation (Year 3)
717301 Programming Languages (Year 3)
COMP807 Algorithms, Graphs and Combinatorics (Postgraduate)
COMP808 Logic, Games and Automata (Postgraduate)
Supervised more than 20 final year student projects (2011–2015)
Supervised five summer research projects (2011 – 2015)

Postgraduate Supervision (Primary Supervisor)

Anastasia Moskvina (PhD)	Completed December 2016
Ziheng Wei (BSc(Hon), PhD)	2014 – 2017
Su Yuan Chen (MSc)	2015-2017
Kostya Ross (MPhil)	2014 – 2015
Zhenwen Cai (BCIS(Hon))	2013

Off Shore Teaching (Collaborative Degree Program)

Discrete Mathematics	2017
Southwest University (SWU) and UoA, Chongqing, China	
Algorithm Design and Analysis	2013-2015
China Jiliang University (CJLU) and AUT, Hangzhou, China	

Seminars and Talks

Networks, Cohesion and Popularity December 2016
State Key Lab of Computer Science, Chinese Academy of Science, China

Hierarchies, Ties and Power in Organizational networks December 2016
Institute of Mathematics and System Sciences, Chinese Academy of Science, China

How to Build Your Network October 2016
Southwest University, Chongqing, China

Organizational Network Analysis April 2016
Centre of Mathematical Social Sciences, University of Auckland, New Zealand

From Data Structures to Social Networks January 2016
Beijing Institute of Technology, Beijing, China

Decidability of the Monadic Theories of Infinite and Bi-infinite Words January 2015
Workshop on Applied Logic (Invited Talk)
Department of Philosophy, University of Auckland, New Zealand

Automatic Structures and Their Isomorphisms January 2012
University of New South Wales, Sydney, Australia.

Automatic Structures and Their Isomorphisms February 2012
Australian National University, Sydney, Australia.

The Isomorphism Problem of Automatic Structures with Transitive Relations December 2011
Asian Logic Conference (Invited Talk)
Victoria University of Wellington, New Zealand.

The Isomorphism Problem of Automatic Trees September 2011
Workshop on Automata Theory and Applications (Invited Talk)
Institute of Mathematical Sciences, National University of Singapore, Singapore.

Efficient Algorithm for Some Classes of Infinite Games July 2011
Technische Universität Ilmenau, Ilmenau, Germany.

The Isomorphism Problem for ω-Automatic Trees May 2010
Universität Leipzig, Leipzig, Germany.

The Isomorphism Problem for Classes of Automatic Structures October 2009
Universität Leipzig, Leipzig, Germany.

Logic Seminar: *On Graphs with Finite Components* October 2008
Cornell University, Ithaca, NY, USA.

An Introduction to Automatic Structures February 2008
Microsoft Research Asia, Beijing, China.

Service

Department Administrative Roles at UoA

BSc(Honours) Coordinator for the Computer Science major
COMPSCI380 (Final Year Project) and COMPSC780 (Honours Dissertation) Coordinator

Program Committee Member

The 13th Pacific Rim International Conference on Artificial Intelligence (PRICAI 2014)
The 28th Australasian Joint Conference on Artificial Intelligence 2015 (AI 2015)
The 8th International Workshop on Agent-based Complex Automated Negotiations (ACAN 2015)
The 12th Annual Conference on Theory and Applications of Models of Computation (TAMC 2015)
The 2nd International Workshop on Smart Simulation and Modelling for Complex Systems (SSMCS2015)
The 5th International Conference on Computational Social Networks (CsoNet 2016)
The 14th Pacific Rim International Conference on Artificial Intelligence (PRICAI 2016)
The 13th Annual Conference on Theory and Applications of Models of Computation (TAMC 2016)
The 14th Annual Conference on Theory and Applications of Models of Computation (TAMC 2017)

Australasian Computer Science Week 2017 (ACSW 2017)

Professional Affiliations

Associated Researcher of the Centre of Mathematical Social Sciences, the University of Auckland

Member of the International Network of Social Network Analysis (INSNA)

Member of China Computer Federation (CCF)

References

Prof. Markus Lohrey (*PostDoc Mentor*)
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Prof. Andre Nies
Department of Computer Science
University of Auckland
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`andre@cs.auckland.ac.nz`

Prof. Dietrich Kuske
Technische Universitt Ilmenau
Fachgebiet Automaten und Logik
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D-98684 Ilmenau, Germany
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