李勇 Yong Li

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Work Experience

Associate Research Professor, **Institute of Software Chinese Academy of Sciences** Oct. 2022 - present
Marie Skłodowska-Curie Research Fellow, **University of Liverpool** Oct. 2022 - Oct. 2024
Research Assistant, **Institute of Software Chinese Academy of Sciences** Apr. 2020 - Oct. 2022
Virtual Postdoctoral Researcher, **working with Prof. Moshe Y. Vardi** Jan. 2020 - Oct. 2022

Education

Unversity of Chinese Academy of Sciences Beijing, China
Ph.D. in Computer Software and Theory Aug. 2013 - Jan. 2020
Advisor: Prof. Lijun Zhang

Nanjing Unversity of Posts and Telecommunications Nanjing, China
B.S. in Computer Science and Technology Sept. 2009 - Jun. 2013

Awards and Honors

- CAS Outstanding PhD Thesis Award Aug. 2022
- Beijing Outstanding Graduate Jul. 2020
- CAS President Scholarship Jul. 2019
- China National Scholarship Nov. 2018
- First Class Scholarship for Ph.D. Student Sept. 2017
- First Class Scholarship for Ph.D. Student Sept. 2016
- China National Scholarship Nov. 2010

Research Stays

Department of Computer Science, Rice Unversity Houston, USA
Host: Prof. Moshe Y. Vardi Feb. 1 - Jul. 02 2019

Institute of Information Science, Academia Sinica Taipei, China
Host: Dr. Yu-Fang Chen Jul. 11 - Jul. 26 2018

Institute of Information Science, Academia Sinica Taipei, China
Host: Dr. Yu-Fang Chen Jan. 27 - Feb. 9 2018

Institute of Information Science, Academia Sinica Taipei, China
Host: Dr. Yu-Fang Chen Nov. 3 - Nov. 18 2017

Institute of Information Science, Academia Sinica Taipei, China
Host: Dr. Yu-Fang Chen Aug. 22 - Sept. 6 2017

Institute of Information Science, Academia Sinica Taipei, China
Host: Dr. Yu-Fang Chen May 17 - May 31 2017

Dependable Systems and Software Group, Saarland University Saarbrücken, Germany
Host: Prof. Holger Hermanns Feb. 1 - Feb. 15 2016

Software Modelling and Verification Group, RWTH Aachen Aachen, Germany
Host: Prof. Joost-Pieter Katoen Oct. 17 2015 - Jan. 31 2016

Professional Activities

- Reviewer: Logical Methods in Computer Science
- Subreviewer: FOSSACS 2024, CSL 2024, CONCUR 2023, CAV 2023, TACAS 2022, CAV 2021, FOSSACS 2020, FM 2019, TASE 2019, ICECCS 2018
- Artifact Evaluation PC member: iFM 2023, TACAS 2022, TACAS 2021, TACAS 2019,

Research Projects

- Project award for Distinguished Research Assistants, PI (Principle Investigator), grant worth of ¥600,000 from Chinese Academy of Sciences, 2020 - 2021
- Formal modelling and reasoning methods for root cause analysis in IT systems, PI, grant worth of ¥250,000 from Cloudwise (Beijing) Technology Co. Ltd., May 2021 - Nov. 2021
- Research on fundamental problems of Büchi automata, PI, grant worth of ¥300,000 from NSFC, Jan. 2022 - Dec. 2024
- Marie Skłodowska-Curie Research Fellowship, Fellow, grant worth of £237,000 from EPSRC, Oct. 2022 - Oct. 2024

Publications

* indicates author list has been sorted alphabetically by last name

[1] Suguman Bansal, Yash Kankariya, and **Yong Li**. DAG-based compositional approaches for LTLf to DFA conversions. In Nina Narodytska and Philipp Rümmer, editors, *24th Conference on Formal Methods in Computer-Aided Design FMCAD 2024*, pages 227–235. TU Wien Academic Press, 2024. Main Track.

[2] Daniele Dell'Erba, **Yong Li**, and Sven Schewe. DFAMiner: Mining minimal separating DFAs from labelled samples. In Andre Platzer, Kristin Yvonne Rozier, Matteo Pradella, and Matteo Rossi, editors, *Formal Methods - 26th International Symposium, FM 2024, Milan, Italy, September 9-13, 2024, Proceedings, Part II*, volume 14934 of *Lecture Notes in Computer Science*, pages 48–66. Springer, 2024.

[3] **Yong Li**, Sven Schewe, and Qiyi Tang. Angluin-style learning of deterministic Büchi and Co-Büchi automata. In Kate Larson, editor, *Proceedings of the Thirty-Third International Joint Conference on Artificial Intelligence, IJCAI-24*, pages 4506–4514. International Joint Conferences on Artificial Intelligence Organization, 8 2024. Main Track.

[4] **Yong Li**, Sven Schewe, and Moshe Y. Vardi. Singly exponential translation of alternating weak Büchi automata to unambiguous Büchi automata. *Theor. Comput. Sci.*, 1006:114650, 2024.

[5] **Yong Li**, Sven Schewe, and Qiyi Tang. A novel family of finite automata for recognizing and learning ømega-regular languages. In Étienne André and Jun Sun, editors, *Automated Technology for Verification and Analysis - 21st International Symposium, ATVA 2023, Singapore, October 24-27, 2023, Proceedings, Part I*, volume 14215 of *Lecture Notes in Computer Science*, pages 53–73. Springer, 2023.

[6] Suguman Bansal, **Yong Li**, Lucas M. Tabajara, Moshe Y. Vardi, and Andrew M. Wells. Model checking strategies from synthesis over finite traces. In Étienne André and Jun Sun, editors, *Automated Technology for Verification and Analysis - 21st International Symposium, ATVA 2023, Singapore, October 24-27, 2023, Proceedings, Part I*, volume 14215 of *Lecture Notes in Computer Science*, pages 227–247. Springer, 2023.

[7] **Yong Li**, Sven Schewe, and Moshe Y. Vardi. Singly exponential translation of alternating weak büchi automata to unambiguous büchi automata. In Guillermo A. Pérez and Jean-François Raskin, editors, *34th International Conference on Concurrency Theory, CONCUR 2023, September 18-23, 2023, Antwerp, Belgium*, volume 279 of *LIPIcs*, pages 37:1–37:17. Schloss Dagstuhl - Leibniz-Zentrum für Informatik, 2023.

[8] Vojtech Havlena, Ondrej Lengál, **Yong Li**, Barbora Smahlíková, and Andrea Turrini. Modular mix-and-match complementation of Büchi automata. In Sriram Sankaranarayanan and Natasha Sharygina, editors, *Tools and Algorithms for the Construction and Analysis of Systems - 29th International Conference, TACAS 2023, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2022, Paris, France, April 22-27, 2023, Proceedings, Part I*, volume 13993 of *Lecture Notes in Computer Science*, pages 249–270. Springer, 2023.

[9] Jianling Fu, Cheng-Chao Huang, **Yong Li**, Jingyi Mei, Ming Xu, and Lijun Zhang. Quantitative controller synthesis for consumption markov decision processes. *Inf. Process. Lett.*, 180:106342, 2023.

[10] Weizhi Feng, **Yong Li**, Andrea Turrini, Moshe Y. Vardi, and Lijun Zhang. On the power of finite ambiguity in büchi complementation. *Inf. Comput.*, 292:105032, 2023.

[11] Yi Li, Xie Li, **Yong Li**, Xuechao Sun, Andrea Turrini, and Lijun Zhang. Synthesizing ranking functions for loop programs via SVM. *Theor. Comput. Sci.*, 935:1–20, 2022.

[12] Moshe Y. Vardi, Seth Fogarty, **Yong Li**, and Yih-Kuen Tsay. Towards a grand unification of büchi complementation constructions. In Jean-François Raskin, Krishnendu Chatterjee, Laurent Doyen, and Rupak Majumdar, editors, *Principles of Systems Design - Essays Dedicated to Thomas A. Henzinger on the Occasion of His 60th Birthday*, volume 13660 of *Lecture Notes in Computer Science*, pages 185–207. Springer, 2022.

[13] Suguman Bansal, Giuseppe De Giacomo, Antonio Di Stasio, **Yong Li**, Moshe Y. Vardi, and Shufang Zhu. Compositional safety LTL synthesis. In Akash Lal and Stefano Tonetta, editors, *Verified Software. Theories, Tools and Experiments - 14th International Conference, VSTTE 2022, Trento, Italy, October 17-18, 2022, Revised Selected Papers*, volume 13800 of *Lecture Notes in Computer Science*, pages 1–19. Springer, 2022.

[14] Shizhen Yu, Yifan Dong, Jiuyang Liu, **Yong Li**, Zhilin Wu, David N. Jansen, and Lijun Zhang. CHA: supporting sva-like assertions in formal verification of chisel programs (tool paper). In Bernd-Holger Schlingloff and Ming Chai, editors, *Software Engineering and Formal Methods - 20th International Conference, SEFM 2022, Berlin, Germany, September 26-30, 2022, Proceedings*, volume 13550 of *Lecture Notes in Computer Science*, pages 324–331. Springer, 2022.

[15] **Yong Li**, Andrea Turrini, Weizhi Feng, Moshe Y. Vardi, and Lijun Zhang. Divide-and-conquer determinization of büchi automata based on SCC decomposition. In Sharon Shoham and Yakir Vizel, editors, *Computer Aided Verification - 34th International Conference, CAV 2022, Haifa, Israel, August 7-10, 2022, Proceedings, Part II*, volume 13372 of *Lecture Notes in Computer Science*, pages 152–173. Springer, 2022.

[16] Chen Fu, Ernst Moritz Hahn, **Yong Li**, Sven Schewe, Meng Sun, Andrea Turrini, and Lijun Zhang. EPMC gets knowledge in multi-agent systems. In Bernd Finkbeiner and Thomas Wies, editors, *Verification, Model Checking, and Abstract Interpretation - 23rd International Conference, VMCAI 2022, Philadelphia, PA, USA, January 16-18, 2022, Proceedings*, volume 13182 of *Lecture Notes in Computer Science*, pages 93–107. Springer, 2022.

[17] **Yong Li**, Yih-Kuen Tsay, Andrea Turrini, Moshe Y. Vardi, and Lijun Zhang. Congruence Relations for Büchi Automata. In *Proceedings of the 24th International Symposium on Formal Methods, FM 2021*, volume 13047 of *Lecture Notes in Computer Science*, pages 465–482. Springer, 2021.

[18] **Yong Li**, Andrea Turrini, Moshe Y. Vardi, and Lijun Zhang. Synthesizing Good-Enough Strategies for LTLf Specifications. In *Proceedings of the Thirtith International Joint Conference on Artificial Intelligence, IJCAI 2021*, pages 4144–4151. ijcai.org, 2021.

[19] **Yong Li**, Yu-Fang Chen, Lijun Zhang, and Depeng Liu. A Novel Learning Algorithm for Büchi Automata Based on Family of DFAs and Classification Trees. *Inf. Comput.*, 2020.

[20] Weizhi Feng, Cheng-Chao Huang, Andrea Turrini, and **Yong Li**. Modelling and Implementation of Unmanned Aircraft Collision Avoidance. In *Dependable Software Engineering: Theories, Tools, and Applications - Sixth International Symposium, SETTA 2020, Guangzhou, China, November 24-28, 2020, Proceedings*, 2020.

[21] Xie Li, Yi Li, **Yong Li**, Xuechao Sun, Andrea Turrini, and Lijun Zhang. SVMRanker: A General Termination Analysis Framework of Loop Programs via SVM. In *Proceedings of the ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering, ESEC/SIGSOFT FSE 2020, Sacramento, USA, November 8-13, 2020*, 2020.

[22] **Yong Li**, Moshe Y. Vardi, and Lijun Zhang. On the Power of Unambiguity in Büchi Complementation. In *Games, Automata, Logics, and Formal Verification - Eleventh International Symposium, GandALF 2020, Brussels, Belgium, September 21-23, 2020, Proceedings*, pages 182–198, 2020.

[23] **Yong Li**, Andrea Turrini, Xuechao Sun, and Lijun Zhang. Proving Non-Inclusion of Büchi Automata based on Monte Carlo Sampling. In *Automated Technology for Verification and Analysis - 18th International Symposium, ATVA 2020, Hanoi, Vietnam, October 19-23, 2020, Proceedings*, 2020.

[24] *Suguman Bansal, **Yong Li**, Lucas M. Tabajara, and Moshe Y. Vardi. Hybrid compositional reasoning for reactive synthesis from finite-horizon specifications. In *The Thirty-Fourth AAAI Conference on Artificial Intelligence, AAAI 2020, New York, NY, USA, February 7-12, 2020*, pages 9766–9774, 2020.

[25] Yi Li, Xuechao Sun, **Yong Li**, Andrea Turrini, and Lijun Zhang. Synthesizing Nested Ranking Functions for Loop Programs via SVM. In *Formal Methods and Software Engineering - 21st International Conference on Formal Engineering Methods, ICFEM 2019, Shenzhen, China, November 5-9, 2019, Proceedings*, pages 438–454, 2019.

[26] **Yong Li**, Xuechao Sun, Andrea Turrini, Yu-Fang Chen, and Junnan Xu. ROLL 1.0: ω-Regular Language Learning Library. In *Tools and Algorithms for the Construction and Analysis of Systems - 25th International Conference, TACAS 2019, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2019, Prague, Czech Republic, April 6-11, 2019, Proceedings, Part I*, pages 365–371, 2019.

[27] **Yong Li**, Andrea Turrini, Yu-Fang Chen, and Lijun Zhang. Learning Büchi Automata and Its Applications. In *Engineering Trustworthy Software Systems - 4th International School, SETSS 2018, Chongqing, China, April 7-12, 2018, Tutorial Lectures*, pages 38–98, 2018.

[28] Yu-Fang Chen, Matthias Heizmann, Ondrej Lengál, **Yong Li**, Ming-Hsien Tsai, Andrea Turrini, and Lijun Zhang. Advanced automata-based algorithms for program termination checking. In *Proceedings of the 39th ACM SIGPLAN Conference on Programming Language Design and Implementation, PLDI 2018, Philadelphia, PA, USA, June 18-22, 2018*, pages 135–150, 2018.

[29] Matthias Heizmann, Yu-Fang Chen, Daniel Dietsch, Marius Greitschus, Jochen Hoenicke, **Yong Li**, Alexander Nutz, Betim Musa, Christian Schilling, Tanja Schindler, and Andreas Podelski. Ultimate Automizer and the Search for Perfect Interpolants - (Competition Contribution). In *Tools and Algorithms for the Construction and Analysis of Systems - 24th International Conference, TACAS 2018, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2018, Thessaloniki, Greece, April 14-20, 2018, Proceedings, Part II*, pages 447–451, 2018.

[30] **Yong Li**, Andrea Turrini, Lijun Zhang, and Sven Schewe. Learning to Complement Büchi Automata. In *Verification, Model Checking, and Abstract Interpretation - 19th International Conference, VMCAI 2018, Los Angeles, CA, USA, January 7-9, 2018, Proceedings*, pages 313–335, 2018.

[31] **Yong Li**, Yu-Fang Chen, Lijun Zhang, and Depeng Liu. A Novel Learning Algorithm for Büchi Automata Based on Family of DFAs and Classification Trees. In *Tools and Algorithms for the Construction and Analysis of Systems - 23rd International Conference, TACAS 2017, Held as Part of the European Joint Conferences on Theory and Practice of Software, ETAPS 2017, Uppsala, Sweden, April 22-29, 2017, Proceedings, Part I*, pages 208–226, 2017.

[32] **Yong Li**, Wanwei Liu, Andrea Turrini, Ernst Moritz Hahn, and Lijun Zhang. An Efficient Synthesis Algorithm for Parametric Markov Chains Against Linear Time Properties. In *Dependable Software Engineering: Theories, Tools, and Applications - Second International Symposium, SETTA 2016, Beijing, China, November 9-11, 2016, Proceedings*, pages 280–296, 2016.

[33] **Yong Li**, Lei Song, Yuan Feng, and Lijun Zhang. Verify LTL with Fairness Assumptions Efficiently. In *23rd International Symposium on Temporal Representation and Reasoning, TIME 2016, Kongens Lyngby, Denmark, October 17-19, 2016*, pages 41–50, 2016.

[34] Tom van Dijk, Ernst Moritz Hahn, David N. Jansen, **Yong Li**, Thomas Neele, Mariëlle Stoelinga, Andrea Turrini, and Lijun Zhang. A Comparative Study of BDD Packages for Probabilistic Symbolic Model Checking. In *Dependable Software Engineering: Theories, Tools, and Applications - First International Symposium, SETTA 2015, Nanjing, China, November 4-6, 2015, Proceedings*, pages 35–51, 2015.