SHUFANG ZHU

Curriculum Vitae

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🖱 *https://shufang-zhu.github.io/*

Education

2014 – 2020 **PhD in Software Engineering**, *East China Normal University*, Shanghai, China.
- **Advisor:** Prof. Geguang Pu
- **Thesis:** Program Synthesis of Linear Temporal Logic over Finite Traces
- **Committee:** Prof. Moshe Y. Vardi (Rice U.), Prof. Giuseppe De Giacomo (U. Oxford), Prof. Meng Sun (Peking U.) Prof. Naijun Zhan (Chinese Academy of Sci.) and Prof. Yuxin Deng (ECNU)

2010 – 2014 **BSc in Software Engineering**, *East China Normal University*, Shanghai, China.

Current Position

Feb.2023 – Present **Senior Research Associate**, *Department of Computer Science*, University of Oxford, UK.
- **Mentor:** Prof. Giuseppe De Giacomo

Previous Positions

Dec.2020 – Nov. 2022 **Research Associate**, *Depart. of Computer, Control and Management Engineering*, Sapienza University of Rome, Rome, Italy.
- **Mentor:** Prof. Giuseppe De Giacomo

May.2020 – Oct.2020 **Junior Researcher**, *Shanghai Industrial Control Safety Innovation Technology Co. LTD*, Shanghai, China.
- **Mentor:** Prof. Geguang Pu

Jun.2018 – Aug.2018 **Researcher Intern**, *OS Kernel Lab of Huawei*, Shanghai, China.
- **Mentors:** Dr. Ming Fu, Dr. Xin Gao

Aug.2016 – Feb.2018 **PhD Researcher**, *Rice University*, Houston, USA.
- **Mentor:** Prof. Moshe Y. Vardi

Research Interests

My research concerns interdisciplinary knowledge across artificial intelligence (AI) and formal methods (FM), focusing on automated reasoning, planning and synthesis.

Teaching

Jul.2023 **Lecturer**, *European Summer School on Artificial Intelligence ESSAI & ACAI*, Ljubljana, Slovenia,
Course: Game-Theoretic Approach to Planning and Synthesis (PhD level).

Feb.2023 **Teaching Assistant**, *University of Oxford*, Oxford, UK,
Course: Foundations of Self-Programming Agents (MS/PhD level).

Jul.2022 **Lecturer**, *Sapienza University of Rome*, Rome, Italy,
Course: Game-Theoretic Approach to Planning and Synthesis (Italian national PhD program in AI).
- Symbolic representation and techniques for program synthesis.
- Solutions for notable cases of LTL_f goals under LTL assumptions.

Nov.2014 **Teaching Assistant**, *East China Normal University*, Shanghai, China,
Course: Tools of Software Analysis and Verification (MS/PhD level).

Research Mentoring

Sep.2021 - July.2022 **Gianmarco Parretti**, *Master Student*, Sapienza University of Rome.
- **Thesis:** Symbolic best-effort synthesis for specifications in Linear Temporal Logic on finite traces
- Paper at the Workshop on Generalization in Planning (GenPlan), 2022

Sep.2018 - Nov.2019 **Yingying Shi**, *Master Student*, East China Normal University.
- *Project:* Automata-based LTL_f reasoning

Sep.2018 - Nov.2019 **Shengping Xiao**, *Undergraduate Student*, East China Normal University.
- *Project:* MONA-based LTL_f to DFA conversion

Services for the Scientific Community

Chair.
2023: AAAI Spring Sympoium "On the Effectiveness of Temporal Logics on Finite Traces in AI"

Program Committee.
2023: IJCAI, KR, FMCAD
2022: AAAI, IJCAI
2021: AAAI

Conference Paper Reviewer.
2023: CAV
2022: CSL
2019: ICALP

Journal Paper Reviewer.
Artificial Intelligence Journal
Formal Methods in System Design
Mathematical Problems in Engineering
IEEE Access

Conference Volunteer.
KR 2021, ATVA 2015 (Head Volunteer)

Awards and Honors

Rising Star in Electrical Engineering and Computer Science (EECS), 2022.

Travel Grant.
KR Diversity&Inclusion Travel Grant 2022, IJCAI 2019, FLoC 2018, SIGLOG/VCLA Travel Award for WiL 2018

Academic Scholarship, *East China Normal University*, 2015, 2016, 2017, 2018, 2019.

Chinese Government Scholarship, *Chinese Scholarship Council*, 2016.

Outstanding Student Scholarship, *East China Normal University*, 2012, 2013, 2014.

Notable Freshman Mentor, *East China Normal University*, 2011.

Open Source Tools

Syft, *Github link:* `https://github.com/Shufang-Zhu/Syft`.
- The first symbolic reactive synthesis tool for finite-trace task specifications.
- The synthesis core is integrated in all state-of-the-art finite-trace task specification synthesizers, and has been successfully extended to support various synthesis scenarios.

GFSynth, *Github link:* `https://github.com/Shufang-Zhu/GFSynth`.
- Reactive synthesis for finite-trace task specifications under Generalized Reactivity (1) environment assumptions.

SyftMax, *Github link:* `https://github.com/Shufang-Zhu/SyftMax`.
- Reactive synthesis of maximally permissive controller for finite-trace task specifications.

Publications

*** indicates author list has been sorted alphabetically by last name**.

In Conference Proceedings

[VSTTE 22] * Suguman Bansal, Giuseppe De Giacomo, Antonio Di Stasio, Yong Li, Moshe Y Vardi, **Shufang Zhu**. "Compositional Safety LTL Synthesis." To appear at the 14th International Conference on Verified Software: Theories, Tools, and Experiments (VSTTE), 2022.

[IJCAI 22] * Giuseppe De Giacomo, Marco Favorito, Jianwen Li, Moshe Y Vardi, Shengping Xiao, **Shufang Zhu**. "LTL$_f$ Synthesis as AND-OR Graph Search: Knowledge Compilation at Work." In Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2022.

[IJCAI 22] **Shufang Zhu**, Giuseppe De Giacomo. "Synthesis of Maximally Permissive Strategies for LTL$_f$ Specifications." In Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2022.

[KR 22] **Shufang Zhu**, Giuseppe De Giacomo. "Act for Your Duties but Maintain Your Rights." In Proc. of International Conference on Principles of Knowledge Representation and Reasoning (KR), 2022.

[IJCAI 21] * Giuseppe De Giacomo, Antonio Di Stasio, Lucas M Tabajara, Moshe Y. Vardi, **Shufang Zhu**. "Finite-Trace and Generalized-Reactivity Specifications in Temporal Synthesis." In Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2021.

[AAAI 21] Shengping Xiao, Jianwen Li, **Shufang Zhu**, Yingying Shi, Geguang Pu, Moshe Y. Vardi. "On-the-fly Synthesis for LTL over Finite Traces." The 35th AAAI Conference on Artificial Intelligence (AAAI), 2021.

[KR 21] * Giuseppe De Giacomo, Antonio Di Stasio, Giuseppe Perelli, **Shufang Zhu**. "Synthesis with Mandatory Stop Actions." In Proc. of International Conference on Principles of Knowledge Representation and Reasoning (KR), 2021.

[GandALF 21] **Shufang Zhu**, Lucas M Tabajara, Geguang Pu, Moshe Y Vardi. "On the Power of Automata Minimization in Temporal Synthesis." In Proc. of International Symposium on Games, Automata, Logics, and Formal Verification (GandALF), 2021.

[KR 20] * Giuseppe De Giacomo, Antonio Di Stasio, Moshe Y. Vardi, **Shufang Zhu**. "Two-stage technique for LTL$_f$ synthesis under LTL assumptions." In Proc. of International Conference on Principles of Knowledge Representation and Reasoning (KR), 2020.

[AAAI 20] **Shufang Zhu**, Giuseppe De Giacomo, Geguang Pu, Moshe Y Vardi. "LTL$_f$ Synthesis with Fairness and Stability Assumptions." In Proc. of AAAI Conference on Artificial Intelligence (AAAI), 2020.

[TACM 19] **Shufang Zhu**, Geguang Pu, Moshe Y. Vardi "First-Order vs. Second-Order Encodings for LTL$_f$-to-Automata Translation." In Proc. of Annual Conference of Theory and Applications of Models of Computation (TAMC), 2019.

[IJCAI 17] **Shufang Zhu**, Lucas M. Tabajara, Jianwen Li, Geguang Pu, Moshe Y. Vardi "Symbolic LTL$_f$ Synthesis." In Proc. of International Joint Conference on Artificial Intelligence (IJCAI), 2017.

[HVC 17] **Shufang Zhu**, Lucas M. Tabajara, Jianwen Li, Geguang Pu, Moshe Y. Vardi "A Symbolic Approach to Safety LTL Synthesis." In Proc. of International Haifa Verification Conference (HVC), 2017.

[ICCAD 17] Jianwen Li, **Shufang Zhu**, Yueling Zhang, Geguang Pu, Moshe Y. Vardi "Safety model checking with complementary approximations." In Proc. of IEEE/ACM International Conference on Computer-Aided Design (ICCAD), 2017.

[HVC 15] Jianwen Li, **Shufang Zhu**, Geguang Pu, Moshe Y. Vardi "SAT-Based Explicit LTL Reasoning." In Proc. of International Haifa Verification Conference (HVC), 2015.

Journal Articles

[JAIR] * Giuseppe De Giacomo, Dror Fried, Fabio Patrizi, **Shufang Zhu**. "Mimicking Behaviors in Separated Domains." Journal of Artificial Intelligence Research (2023).

[FMSD] * Giuseppe De Giacomo, Antonio Di Stasio, Lucas M. Tabajara, Moshe Y. Vardi, **Shufang Zhu**. "Finite-trace and generalized-reactivity specifications in temporal synthesis." Formal Methods Syst. Des. (2023). https://doi.org/10.1007/s10703-023-00413-2

[FMSD] Jianwen Li, **Shufang Zhu**, Geguang Pu, Lijun Zhang, Moshe Y. Vardi. "SAT-based explicit LTL reasoning and its application to satisfiability checking." Formal Methods Syst. Des. 54(2): 164-190 (2019).

[FAC] Jianwen Li, **Shufang Zhu**, Geguang Pu, Moshe Y. Vardi, Jifeng He "An explicit transition system construction approach to LTL satisfiability checking." Formal Aspects Comput. 30(2): 193-217 (2018).