Fu Song

Curriculum Vitae

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Current Research Interests

formal verification, automata theory and logic, automated testing,
safety/security of programs and AI-enabled systems

Education Experiences

2009.11 – 2013.4 Ph.D. in Computer Science
Université Paris Cité (previous known as University Paris-Diderot, Paris 7), Paris, France
Thesis: *On Pushdown Systems Model Checking:*
Application to Malware Detection and Software Model-Checking
Advisor: Dr. Tayssir Touili

2007.3 – 2009.6 MSc in Software Engineering
East China Normal University, Shanghai, China

2002.9 – 2006.6 BSc in Electronic Information and Technology
Ningbo University, Ningbo, China

Work Experiences

Since 2021.7 Associate Professor (Tenured) and Research Professor, Ph.D supervisor
Co-Director of Systems and Security Center (SSC)
School of Information Science and Technology
ShanghaiTech University, Shanghai, China

2016.8 – 2021.7 Assistant Professor (Tenure-track) and Research Professor, Ph.D supervisor
Co-Director of Systems and Security Center (SSC)
School of Information Science and Technology
ShanghaiTech University, Shanghai, China

2016.1 – 2016.7 Research Associate Professor
School of Computer Science and Software Engineering
East China Normal University, Shanghai, China

2013.8 – 2015.12 Lecturer
School of Computer Science and Software Engineering
East China Normal University, Shanghai, China

2014.7 – 2014.9 Invited Researcher (Collaborator: Prof. Yang Liu)
School of Computer Science and Engineering
Nanyang Technological University, Singapore

Honors and Awards

2023 Distinguished Paper Award
The CIE Conference on Cyber Security 2023

2022 Amazon Research Awards Fall 2021, $40,000 in cash and $20,000 in AWS credits

2020 Excellent Faculty Award, ShanghaiTech University

2020 Outstanding Research Award, School of Information Science and Technology at ShanghaiTech

2020 Outstanding Instructor Award, 2019 Baidu PaddlePaddle AI Adversarial Attack Contest
The team won the First-Place Award

2019 Excellent Faculty Award, ShanghaiTech University

2019 Outstanding Research Award, School of Information Science and Technology at ShanghaiTech

2019 Outstanding Instructor Award, 2019 National College Student Network Security Contest
The CTF team won the Second-Prize Award

2018 Excellent Course Award, Education Commission of Shanghai Municipality
SI100: Introduction to Information Science and Technology
with Sören Schwertfeger, Jingyi Yu, Xuming He, Xiliang Luo, Haoyu Wang

2018 Excellent Faculty Award, ShanghaiTech University

2018 Outstanding Research Award, School of Information Science and Technology at ShanghaiTech

2018 Outstanding Instructor Award, 2018 National College Student Network Security Contest
The CTF team won the First-Prize Award

2017 Outstanding Instructor Award, 2017 National College Student Network Security Contest
The CTF team won the First-Prize Award

2012 EASST Best Paper Award
The 18^{th} *International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS'12)*

Student Advising

Guowei Yang 2022 – Now, MS student, co-supervised with Yuqi Chen

Jiaye Zheng 2022 – Now, MS student, co-supervised with Chundong Wang

Cunhan You 2022 – Now, MS student

Shi Pu 2021 – Now, MS student

Weijie Shao 2021 – Now, MS student

Yangbiao Ji 2021 – Now, MS student

Hongyi Xie 2021 – Now, MS student

Qi Qin 2020 – Now, MS student

Awards: 2022 National Scholarship for Master Graduates

Yuxin Fan 2020 – Now, MS student

Awards: 2022 National Scholarship for Master Graduates

Mingyang Liu 2020 – Now, MS student

Huiyu Tan 2020 – Now, MS student

Guangke Chen 2019 – Now, Ph.D. student

	Awards:	2020 Merit Student at ShanghaiTech University 2020 National Scholarship for Master Graduates 2022 Merit Student at ShanghaiTech University
Zhe Zhao	2018 – Now, Ph.D. student.	
	Awards:	First Place of 2019 Baidu PaddlePaddle AI Adversarial Attack Contest 2021 Merit Student at ShanghaiTech University 2021 National Scholarship for Ph.D. Graduates
Pu Sun	2018 – Now, Ph.D. student	
	Awards:	2021 Excellent Student at ShanghaiTech University
Luwei Cai	2018 – Now, Ph.D. student	
Yedi Zhang	2017 – Now, Ph.D. student	
	Awards:	2019 AAAI Travel Grant 2019 Merit Student at ShanghaiTech University 2019 CSC-IBM Excellent Chinese Student Scholarship 2020 Excellent Student at ShanghaiTech University 2021 Excellent Student at ShanghaiTech University 2022 National Scholarship for Ph.D. Graduates
Pengfei Gao	2017 – Now, Ph.D. student	
	Awards:	2018 FLoC Travel Grant 2019 Excellent Student at ShanghaiTech University 2019 ETAPS Scholarship 2019 CSC-IBM Excellent Chinese Student Scholarship 2020 National Scholarship for Ph.D. Graduates 2020 Merit Student at ShanghaiTech University 2021 Merit Student at ShanghaiTech University 2021 Baosteel Scholarship
Yongjie Xu	2019 – 2022, MS student, Hikvision	
Jun Zhang	2016 – 2020, MS student, Ant Group	
Yusi Lei	2017 – 2019, MS student, first employment: Google, Singapore	
Feng Wang	2016 – 2019, MS student, Ant Group	
Yu Tang	2015 – 2018, MS student, first employment: China Financial Futures Exchange Co. Ltd.	
Yao Zeng	2015 – 2018, MS student, first employment: Shenwan Hongyuan Securities Co. Ltd.	

Curriculum Development

2019 Spring	CS244: Theory of Computation (Graduate)
2017 Spring	CS131: Programming Languages and Compilers (Undergraduate)
2016 Fall	CS100: Introduction of Programming Languages (Undergraduate)

Teaching Experiences

Course	Credit	Course Level	Semester	♯Students	♯Class Hours	Course Evaluation	Teacher Evaluation
Introduction to Programming	4	Undergraduate	Fall'16	201	32	4.50	4.46

			Fall'18	319	21	4.05	4.61
Programming Languages and Compilers	4	Undergraduate	Spring'17	18	64	4.16	4.49
			Spring'18	16	64	4.85	4.92
			Fall'18	33	64	4.66	4.77
			Fall'19	35	64	4.87	4.95
			Spring'21	39	64	4.33	4.60
			Spring'22	24	64	4.65	4.88
			Spring'23	7	64	-	-
Introduction to Information Science and Technology	4	Undergraduate	Spring'17	211	16	3.96	4.32
Theory of Computation	4	Undergraduate	Spring'19	15	64	4.72	4.85
		Graduate		6	64	4.92	4.97
		Undergraduate	Fall'20	21	64	4.6	4.62
		Graduate		29	64	4.44	4.69
		Undergraduate	Fall'21	5	64	4.71	4.67
		Graduate		15	64	4.87	4.88
		Undergraduate	Fall'22	7	64	4.96	4.96
		Graduate		8	64		

Grants

2021 – 2024 Key Problem Study for Secure Implementation of Masked Programs (PI)
National Natural Science Foundation of China, No. 62072309
Award amount: CNY 560,000.00

2018 – 2020 Detecting Anomalies in Reactive Systems (co-PI, with Lijun Zhang & Andreas Zeller)
NSFC-DFG International Joint Project, No. 61761136011
Award amount: CNY 1,800,000.00

2017 – 2018 Learning based Phishing Websites: Detection, Classification and Adversary (PI)
CCF-NSFOCUS "Kunpeng" Program Project,
Award amount: CNY 80,000.00

2016 – 2020 Model Checking Large Scale Probabilistic and Concurrent Timed Systems (co-PI, with Lijun Zhang)
National Natural Science Foundation of China, No. 61532019
Award amount: CNY 2,850,000.00

2016 – 2019 Research on Key Technologies of Information Security and Privacy Preservation for Vehicular Ad Hoc Networks and Vehicular Cloud
National Natural Science Foundation of China, No. 61572198
Award amount: CNY 660,000.00

2015 – 2017 Research on Static Analysis and Detection of Malware (PI)
National Natural Science Foundation of China, No. 61402179
Award amount: CNY 270,000.00

2015 – 2016 Key Problem Study for Construction of Trustworthy China Subway Control System (iCMTCt) in Uncertain Environment
National Natural Science Foundation of China, No. 91418203
Award amount: CNY 1,500,000.00

2015 – 2018 Research on modelling and model checking of CPS stochastic behaviors
National Natural Science Foundation of China, No. 61472140
Award amount: CNY 830,000.00

2014 – 2016 Static Analysis Techniques for Complex Binary Program (PI)
Shanghai Pujiang Talent Program, No. 14PJ1403200
Award amount: CNY 200,000.00

2014 – 2015 Model-Checking Binary Program (PI)
Shanghai ChenGuang Scholar Program, No. 13CG21
Award amount: CNY 60,000.00

Publications

My research spans theory and practice, and as a consequence, the cultural norms in different sub-communities has led to the author lists ordered by "contribution/tradition" or alphabetically by last name. I have marked where authors are sorted alphabetically by last name. $\star$ denotes corresponding author.

Total: 2 prefaces, 4 book chapters, 27 journal papers, 50 conference papers, 8 patents, including 35 CCF-A/CAS-JCR-Q1 papers and 19 CCF-B/CAS-JCR-Q2 papers

Edited Volumes

[1] Preface to Special Issue on System Software Security (Chinese)
Min Yang, Chao Zhang, **Fu Song** and Yuan Zhang
Journal of Software, 2022, 33(6): 1959–1960

[2] Preface to Special Issue on System Software Security
Min Yang, Chao Zhang, **Fu Song** and Yuan Zhang
International Journal of Software and Informatics, 2022, 12(3): 259–261

Book Chapters

[1] Research Progress and Trends on Domain-Specific Modeling and Formal Verification of Safety Critical Systems (Chinese)
Dianfu Ma, Wensheng Niu, Sheng Cheng, Zhong Ma, **Fu Song**, Jie Luo, Ning Ge, Ping Lu, Ming Mu, Chuang Wang, Huaqiang Qiu, Yibin Tang and Xinfa Dai
CCF 2020–2021 Progress Report on Chinese Computer Science and Technolgy, China Machine Press, 141–189, 2021

[2] Research Progress and Trends on Formal Methods (Chinese)
Lei Bu, Liqian Chen, Zhe Chen, Zhenbang Chen, Xinyu Feng, Yuan Feng, Fei He, Guoqiang Li, Wanwei Liu, Fefei Ma, **Fu Song**, Youcheng Sun, Jingyi Wang, Min Wu, Zhiwu Xu, Bai Xie, Pengfei Yang, Xinping Yi, Lijun Zhang, and Min Zhang (Alphabetical Ordering)
CCF 2019–2020 Progress Report on Chinese Computer Science and Technolgy, China Machine Press, 491–539, 2020

[3] Research Progress and Trends on Formal Verification of Artificial Intelligence Systems (Chinese)
Lei Bu, Liqian Chen, Yunwei Dong, Xiaowei Huang, Jianlin Li, Qin Li, Wanwei Liu, Wenjie Ruan, **Fu Song**, Cong Tian, Shuling Wang, Zhilin Wu, Bai Xie, Pengfei Yang, Liangzhe Yin, Bohua Zhan, Min Zhang, Lijun

Zhang, Xingyuan Zhang and Yongwang Zhao (Alphabetical Ordering)
CCF 2017–2018 Progress Report on Chinese Computer Science and Technolgy, China Machine Press, 1–68, 2018

[4] Formal Reasoning About Infinite Data Values: An Ongoing Quest (Invited survey)
Taolue Chen, **Fu Song** and Zhilin Wu (Alphabetical Ordering)
Engineering Trustworthy Software Systems (SETTS). Lecture Notes in Computer Science, Springer, 10215:195–257, 2016

Refereed Journal Articles

[1] Compositional Verification of Efficient Masking Countermeasures against Side-Channel Attacks
Pengfei Gao, Yedi Zhang, **Fu Song***, Taolue Chen and Francois-Xavier Standaert
Proceedings of the ACM on Programming Languages, Volume 7, Number OOPSLA2, 2023, CCF-A

[2] Qualitative and Quantitative Model Checking against Recurrent Neural Networks
Zhen Liang, Wanwei Liu, **Fu Song**, Bai Xue, Wenjing Yang, Ji Wang and Zhengbin Pang
Journal of Computer Science and Technology, 2023, CCF-B, CAS-JCR-Q2

[3] VenomAttack: Automated and Adaptive Activity Hijacking in Android
Pu Sun, Sen Chen, Lingling Fan, Pengfei Gao, **Fu Song*** and Min Yang
Frontiers of Computer Science, 17(1): 171801, 2023, CCF-B, CAS-JCR-Q2

[4] Towards Understanding and Mitigating Audio Adversarial Examples for Speaker Recognition
Guangke Chen, Zhe Zhao, **Fu Song***, Sen Chen, Lingling Fan, Feng Wang, and Jiashui Wang
IEEE Transactions on Dependable and Secure Computing, 2022, CCF-A, CAS-JCR-Q1

[5] AS2T: Arbitrary Source-To-Target Adversarial Attack on Speaker Recognition Systems
Guangke Chen, Zhe Zhao, **Fu Song***, Sen Chen, Lingling Fan, and Yang Liu
IEEE Transactions on Dependable and Secure Computing, 2022, CCF-A, CAS-JCR-Q1

[6] Precise Quantitative Analysis of Binarized Neural Networks: A BDD-based Approach
Yedi Zhang, Zhe Zhao, Guangke Chen, **Fu Song*** and Taolue Chen
ACM Transactions on Software Engineering and Methodology, 32(3), 62:1–62:51, 2023, CCF-A, CAS-JCR-Q1

[7] ESampler: Boosting Sampling of Satisfying Assignments for Boolean Formulas via Derivation
Yongjie Xu, **Fu Song*** and Taolue Chen
Journal of Systems Architecture, 129:102615, 2022, CCF-B, CAS-JCR-Q2

[8] Taking Care of the Discretization Problem: A Comprehensive Study of the Discretization Problem and A Black-Box Adversarial Attack in Discrete Integer Domain
Bu Lei, Zhe Zhao, Yuchao Duan and **Fu Song***
IEEE Transactions on Dependable and Secure Computing, 19(5):3200–3217, 2022, CCF-A, CAS-JCR-Q1

[9] Advanced Evasion Attacks and Mitigations on Practical ML-Based Phishing Website Classifiers
Fu Song*, Yusi Lei, Sen Chen, Lingling Fan and Yang Liu
International Journal of Intelligent Systems, 36(9):5210–5240, 2021, CAS-JCR-Q1 .

[10] Formal Verification of Masking Countermeasures for Arithmetic Programs
Pengfei Gao, Hongyi Xie, Pu Sun, Jun Zhang, **Fu Song*** and Taolue Chen
IEEE Transactions on Software Engineering, 48(3):973–1000, 2022, CCF-A, CAS-JCR-Q1

[11] A Hybrid Approach to Formal Verification of Higher-Order Masked Arithmetic Programs
Pengfei Gao, Yongyi Xie, **Fu Song*** and Taolue Chen
ACM Transactions on Software Engineering and Methodology, 30(3):26:1–26:42, 2021, CCF-A, CAS-JCR-Q1

[12] Model-based Automated Testing of JavaScript Web Applications via Longer Test Sequences
Pengfei Gao, Yongjie Xu, **Fu Song*** and Taolue Chen
Frontiers of Computer Science, 16(3):163204, 2021, CCF-B, CAS-JCR-Q2

[13] Verifying ReLU Neural Networks from a Model Checking Perspective
Wanwei Liu, **Fu Song**, Tanghaoran Zhang and Ji Wang
Journal of Computer Science and Technology, 35(6):1365–1381,2020, CCF-B, CAS-JCR-Q2

[14] Making Agents' Abilities Explicit
Yedi Zhang, **Fu Song*** and Taolue Chen
IEEE Access 7: 101804–101819, 2019, CAS-JCR-Q3

[15] Verifying and Quantifying Side-Channel Resistance of Masked Software Implementations
Pengfei Gao, Jun Zhang, **Fu Song*** and Chao Wang
ACM Transactions on Software Engineering and Methodology, 28(3):16:1–16:32, 2019, CCF-A, CAS-JCR-Q1

[16] Fuzzy Pushdown Termination Games
Haiyu Pan, **Fu Song**, Yongzhi Cao, and Junyan Qian
IEEE Transactions on Fuzzy Systems, 27(4): 760–774, 2019, CAS-JCR-Q1

[17] Towards Backbone Computing: A Greedy-Whitening Based Approach
Yueling Zhang, Min Zhang, Geguang Pu, **Fu Song** and Jianwen Li
AI Communications, 31(3): 267–280, 2018

[18] Analyzing Pushdown Systems with Stack Manipulation
Fu Song
Information and Computation, 259(1): 41–71, 2018, CCF-A

[19] Model-Checking for Heterogeneous Multi-agent Systems (Chinese)
Yedi Zhang and **Fu Song***
Journal of Software, 29(6):1–13, 2018, CCF-A

[20] On the Complexity of ω-Pushdown Automata
Yusi Lei, Wanwei Liu, Min Zhang and **Fu Song***
SCIENCE CHINA Information Sciences, 60:112102:1–112102:15, 2017, CCF-A, CAS-JCR-Q2

[21] On Temporal Logics with Data Variable Quantifications: Decidability and Complexity
Fu Song and Zhilin Wu (Alphabetical Ordering)
Information and Computation, 251:104–139, 2016, CCF-A, CAS-JCR-Q2

[22] Survey on Formal Models to Reason about Infinite Data Values (Chinese)
Fu Song and Zhilin Wu (Alphabetical Ordering)
Journal of Software (JOS), 27(3):a14, 2016, CCF-A

[23] An Improved Online/Offline Identity-Based Signature Scheme for WSNs
Ya Gao, Peng Zeng, Kim-Kwang Raymond Choo and **Fu Song**
Journal of Network Security (IJNS), 18(6):1143–1151, 2016

[24] Model-checking Software Library API Usage Rules
Fu Song and Tayssir Touili
Software and Systems Modeling, 15(4):961–985, 2016, CCF-B, CAS-JCR-Q2

[25] Model Checking Dynamic Pushdown Networks
Fu Song and Tayssir Touili
Formal Aspects of Computing, 27(2):397–421, 2015, CCF-B

[26] Efficient CTL Model-Checking for Pushdown Systems
Fu Song and Tayssir Touili
Theoretical Computer Science, 549:127–145, 2014, CCF-B

[27] Pushdown Model Checking for Malware Detection
Fu Song and Tayssir Touili
International Journal on Software Tools for Technology Transfer, 16(2):147–173, 2014, CCF-C

Refereed Conference Papers

[1] An Automata-Theoretic Approach to Synthesizing Binarized Neural Networks
Ye Tao, Wanwei Liu, **Fu Song**, Zhen Liang, Ji Wang and Hongxu Zhu
In Proceedings of the 21st International Symposium on Automated Technology for Verification and Analysis (ATVA), 2023, CCF-C

[2] QFA2SR: Query-Free Adversarial Transfer Attacks to Speaker Recognition Systems
Guangke Chen, Yedi Zhang, Zhe Zhao and **Fu Song**⋆
In Proceedings of the 32nd USENIX Security Symposium (Security), 2023, CCF-A

[3] CodeMark: Imperceptible Watermarking for Code Datasets against Neural Code Completion Models
Zhensu Sun, Xiaoning Du, **Fu Song**⋆ and Li Li
In Proceedings of the 31th ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), 2023, CCF-A

[4] QEBVerif: Quantization Error Bound Verification of Neural Networks
Yedi Zhang, **Fu Song**⋆ and Jun Sun
In Proceedings of the 35th International Conference on Computer Aided Verification (CAV), 2023, CCF-A

[5] Automated Verification of Correctness for Masked Arithmetic Programs
Mingyang Liu, **Fu Song**⋆ and Taolue Chen
In Proceedings of the 35th International Conference on Computer Aided Verification (CAV), 2023, CCF-A

[6] SCAGuard: Detection and Classification of Cache Side-Channel Attacks via Attack Behavior Modeling and Similarity Comparison
Limin Wang, Lei Bu and **Fu Song**
In Proceedings of the 59th ACM/IEEE Design Automation Conference (DAC), 2023, CCF-A

[7] Don't Complete It! Preventing Unhelpful Code Completion for Productive and Sustainable Neural Code Completion Systems
Zhensu Sun, Xiaoning Du, **Fu Song**, Shangwen Wang, Mingze Ni and Li Li
In Proceedings of the 44th IEEE/ACM International Conference on Software Engineering (ICSE), 2023

[8] QVIP: An ILP-based Formal Verification Approach for Quantized Neural Networks
Yedi Zhang, Zhe Zhao, Guangke Chen, **Fu Song**⋆, Min Zhang and Taolue Chen
In Proceedings of the 37th IEEE/ACM International Conference on Automated Software Engineering (ASE), 82:1–82:13, 2022, CCF-A

[9] CLEVEREST: Accelerating CEGAR-based Neural Network Verification via Adversarial Attacks
Zhe Zhao, Yedi Zhang, Guangke Chen, **Fu Song**⋆, Taolue Chen and Jiaxiang Liu
In Proceedings of the 29th Static Analysis Symposium (SAS), 449–473, 2022, CCF-B

[10] DeJITLeak: Eliminating JIT-Induced Timing Side-Channel Leaks
Qi Qin, JulianAndres JiYang, **Fu Song**⋆, Taolue Chen and Xinyu Xing

In Proceedings of the 21st ACM Joint European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE), 872–884, 2022, CCF-A

[11] PoS4MPC: Automated Security Policy Synthesis for Secure Multi-Party Computation
Yuxin Fan, **Fu Song**⋆, Taolue Chen, Liangfeng Zhang and Wanwei Liu
In Proceedings of the 34rd International Conference on Computer Aided Verification (CAV), 385–406, 2022 , CCF-A

[12] CoProtector: Protect Open-Source Code against Unauthorized Training Usage with Data Poisoning
Zhensu Sun, Xiaoning Du, **Fu Song**, Mingze Ni and Li Li
In Proceedings of The Web Conference (WWW), 652–660, 2022, CCF-A

[13] Locality based Cache Side Channel Attack Detection
Limin Wang, Lei Bu and **Fu Song**
In Proceedings of the 10th International Workshop on Security Proofs for Embedded Systems (PROOFS), 87:49–65, 2022

[14] ESAMPLER: Efficient Sampling of Satisfying Assignments for Boolean Formulas
Yongjie Xu, **Fu Song**⋆ and Taolue Chen
In Proceedings of the 7th Symposium on Dependable Software Engineering Theories, Tools and Applications (SETTA), 279–298, 2021, CCF-C

[15] Peeking into the Gray Area of Mobile World: Empirical Investigation of Unlabeled Android Apps in Industry
Sen Chen, Lingling Fan, Cuiyun Gao, **Fu Song** and Yang Liu
In Proceedings of the 32th International Symposium on Software Reliability Engineering (ISSRE), 579–590, 2021, CCF-B

[16] Eager Falsification For Accelerating Robustness Verification of Deep Neural Networks
Min Zhang, Wenjie Wan, Zhaodi Zhang, **Fu Song**, Xuejun Wen and Xingwu Guo
In Proceedings of the 32th International Symposium on Software Reliability Engineering (ISSRE), 345–356, 2021, CCF-B

[17] Attack as Defense: Characterizing Adversarial Examples using Robustness
Zhe Zhao, Guangke Chen, Jingyi Wang, Yiwei Yang, **Fu Song**⋆ and Jun Sun
In Proceedings of the 30th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 42–55, 2021, CCF-A

[18] BDD4BNN: A BDD-based Quantitative Analysis Framework for Binarized Neural Networks
Yedi Zhang, Zhe Zhao, Guangke Chen, **Fu Song**⋆ and Taolue Chen
In Proceedings of the 33rd International Conference on Computer Aided Verification (CAV), 175–200, 2021 , CCF-A

[19] Inferring Loop Invariants for Multi-Path Loops
Yingwen Liu, Yao Zhang, Sen Chen, **Fu Song**, Xiaofei Xie, Xiaohong Li and Lintan Sun
In Proceedings of the 15th International Symposium on Theoretical Aspects of Software Engineering (TASE), 63–70, 2021, CCF-C

[20] Who is Real Bob? Adversarial Attacks on Speaker Recognition Systems
Guangke Chen, Sen Chen, Lingling Fan, Xiaoning Du, Zhe Zhao, **Fu Song**⋆ and Yang Liu
In Proceedings of the 42st IEEE Symposium on Security and Privacy (Oakland, S&P), 694–711, 2021, CCF-A

[21] Patch Based Vulnerability Matching for Binary Programs
Yifei Xu, Zhengzi Xu, Bihuan Chen, **Fu Song**, Yang Liu and Ting Liu

In Proceedings of the 29th ACM SIGSOFT International Symposium on Software Testing and Analysis (ISSTA), 376–387, 2020, CCF-A

[22] Quantitative Verification of Masked Arithmetic Programs Against Side-Channel Attacks
Pengfei Gao, Hongyi Xie, Jun Zhang, **Fu Song*** and Taolue Chen
In Proceedings of the 25th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 155–173, 2019, CCF-B

[23] SMT-Based Bounded Schedulability Analysis of the Clock Constraint Specification Language
Min Zhang, **Fu Song***, Fei Gao, Frederic Mallet and Xiaohong Chen
In Proceedings of the 22nd International Conference on Fundamental Approaches to Software Engineering (FASE), 61–78, 2019, CCF-B

[24] Probabilistic Alternating-Time Mu-Calculus
Fu Song, Yedi Zhang, Yu Tang, Taolue Chen and Zhiwu Xu
In Proceedings of the Thirty-Third AAAI Conference on Artificial Intelligence (AAAI), 6179–6186, 2019, CCF-A

[25] Android Malware Family Classification and Characterization Using CFG and DFG
Zhiwu Xu, Kerong Ren and **Fu Song**
In Proceedings of the 13th International Symposium on Theoretical Aspects of Software Engineering (TASE), 49–56, 2019, CCF-C

[26] SCInfer: Refinement-based Verification of Software Countermeasures against Side-Channel Attacks
Jun Zhang, Pengfei Gao, **Fu Song*** and Chao Wang
In Proceedings of the 30th International Conference on Computer Aided Verification (CAV), 157–177, 2018 , CCF-A

[27] Android Stack Machine
Taolue Chen, Jinlong He, **Fu Song**, Guozhen Wang, Zhilin Wu and Jun Yan (Alphabetical Ordering)
In Proceedings The 30th International Conference on Computer Aided Verification (CAV), 487–504, 2018, CCF-A

[28] KRust: A Formal Executable Semantics of Rust
Feng Wang, **Fu Song***, Min Zhang, Xiaoran Zhu and Jun Zhang
In Proceedings of the 12th International Symposium on Theoretical Aspects of Software Engineering (TASE), 44–51, 2018, CCF-C

[29] Model Checking Pushdown Epistemic Game Structures
Taolue Chen, **Fu Song*** and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 19th International Conference on Formal Engineering Methods (ICFEM), 36–53, 2017 , CCF-C

[30] Tractability of separation logic with inductive definitions: Beyond lists
Taolue Chen, **Fu Song** and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 28th International Conference on Concurrency Theory (CONCUR), 37:1–37:17, 2017, CCF-B

[31] SPAIN: Security Patch Analysis for Binaries - Towards Understanding the Pain and Pills
Zhengzi Xu, Bihuan Chen, Mahinthan Chandramohan, Yang Liu and **Fu Song**
In Proceedings of the 39th ACM/IEEE International Conference on Software Engineering (ICSE),462–472,2017, CCF-A

[32] Reasoning about Periodicity on Infinite Words
Wanwei Liu, **Fu Song** and Ge Zhou
In Proceedings of the 3rd Symposium on Dependable Software Engineering (SETTA), 200–215, 2017, CCF-C

[33] Optimizing Backbone Filtering
Yueling Zhang, Jianwen Li, Min Zhang, Geguang Pu and **Fu Song**
In Proceedings of the 11th International Symposium on Theoretical Aspects of Software Engineering (TASE), 1–8, 2017, CCF-C

[34] Verifying Pushdown Multi-Agent Systems against Strategy Logics
Taolue Chen, **Fu Song**, and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 25th International Joint Conference on Artificial Intelligence (IJCAI), 180–186, 2016, CCF-A

[35] Global Model Checking On Pushdown Multi-Agent Systems
Taolue Chen, **Fu Song**, and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 30th AAAI Conference on Artificial Intelligence (AAAI), 2459–2465, 2016, CCF-A

[36] On Reachability Analysis of Pushdown Systems with Transductions: Application to Boolean Programs with Call-By-Reference
Fu Song, Weikai Miao, Geguang Pu, and Min Zhang
In Proceedings of the 26th International Conference on Concurrency Theory (CONCUR), 383–397, 2015, CCF-B

[37] On the Satisfiability of Indexed Linear Temporal Logics
Taolue Chen, **Fu Song**, and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 26th International Conference on Concurrency Theory (CONCUR), 254–267, 2015, CCF-B

[38] Modeling and Verifying Google File System
Bo Li, Mengdi Wang, Yongxin Zhao, Geguang Pu, Huibiao Zhu, and **Fu Song**
In Proceedings of the 16th IEEE International Symposium on High Assurance Systems Engineering (HASE), 207–214, 2015

[39] Model-checking for Android Malware Detection
Fu Song and Tayssir Touili
In Proceedings of the 12th Asian Symposium on Programming Languages and Systems (APLAS), 216–235, 2014, CCF-C

[40] Extending Temporal Logics with Data Variable Quantifications
Fu Song and Zhilin Wu (Alphabetical Ordering)
In Proceedings of the 34th International Conference on Foundation of Software Technology and Theoretical Computer Science (FSTTCS), 253–265, 2014, CCF-C

[41] LTL Model-Checking for Malware Detection
Fu Song and Tayssir Touili
In Proceedings of the 19th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 416–431, 2013, CCF-B

[42] Model Checking Dynamic Pushdown Networks
Fu Song and Tayssir Touili

In Proceedings of the 11th Asian Symposium on Programming Languages and Systems (APLAS),33–49,2013 , CCF-C

[43] Model-checking Software Library API Usage Rules
Fu Song and Tayssir Touili
In Proceedings of the 10th International Conference on Integrated Formal Methods (iFM), 192–207, 2013

[44] Pommade: Pushdown Model-Checking for Malware Detection
Fu Song and Tayssir Touili
In Proceedings of the 9th Joint Meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE), 607–610, 2013

[45] Efficient Malware Detection Using Model-Checking
Fu Song and Tayssir Touili
In Proceedings of the 18th International Symposium on Formal Methods (FM), 418–433, 2012, CCF-A

[46] Pumoc: A CTL Model-Checker for Sequential Programs
Fu Song and Tayssir Touili
In Proceedings of the 27th IEEE/ACM International Conference on Automated Software Engineering (ASE), 346–349, 2012

[47] Pushdown Model Checking For Malware Detection
Fu Song and Tayssir Touili
In Proceedings of the 18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS), 110–125, 2012, CCF-B

[48] Efficient CTL Model-Checking for Pushdown Systems
Fu Song and Tayssir Touili
In Proceedings of the 22nd International Conference on Concurrency Theory (CONCUR), 434–449, 2011, CCF-B

[49] A Distributed Clustering Algorithm for Voronoi Cell-Based Large Scale Wireless Sensor Network
Jiehui Chen, Chul soo Ki, and **Fu Song**
In Proceedings of the International Conference on Communications and Mobile Computing (CMC), 3:209–213, 2010

[50] Integrating the b-method into PVS
Jiaming Zhou, Jian Guo, and **Fu Song**
In Proceedings of the International Conference on Information Engineering and Computer Science (ICIECS), 1–4, 2009

Patents

[1] An Acoustic Feature based Appraoch for Adversarial Voices Detection
Fu Song, Guangke Chen and Zhe Zhao
Application No.: 202111060044.X, pending

[2] A BDD-based Quantitative Analysis Framework for Binarized Neural Networks
Fu Song and Yedi Zhang
Application No.: 202110619510.7, pending

[3] A Robustness based Approach for Adversarial Example Detection
Fu Song, Zhe Zhao and Guangke Chen
Application No.: 202011284008.7, pending

[4] An Attack Cost based Approach for Adversarial Example Detection
Fu Song, Zhe Zhao and Guangke Chen
Application No.: 202011285900.7, pending

[5] A Graph-Isomorphism based Verification Approach for Countermeasures against Power-based Higher-order Side Channel Attacks
Fu Song, Pengfei Gao and Hongyi Xie
Application No.: 202010913876.0, pending

[6] A GPU based Solving Approach for Model Counting and their Constraints
Fu Song, Pengfei Gao and Hongyi Xie
Application No.: 202010908484.5, pending

[7] A Divide-and-Conquer based Verification Approach for Countermeasures against Power-based Higher-order Side Channel Attacks
Fu Song, Pengfei Gao and Hongyi Xie
Application No.: 202010908485.X, pending

[8] A Formal Verification Approach for Countermeasures against Power-based Side Channel Attacks
Fu Song
No.: ZL 2018 1 0626315.5,

Tools

- DeJITLeak: Eliminating JIT-Induced Timing Side-Channel Leaks
- A^2D: Attack as defense: characterizing adversarial examples using robustness
- LJS: A Model-based Automated Testing Tool for JavaScript Web Applications
- QMVerif: A Compositional Verification Tool for Masking Countermeasures of Arithmetic Programs
- QMSInfer: A Quantitative Verification Tool for Masking Countermeasures of Boolean Programs
- BinXray: A Patch Based Vulnerability Matching Tool for Binary Programs
- FakeBob: A Black-box Attack Tool for Speaker Recognition Systems
- SCInfer: A Refinement-based Verification Tool for Masking Countermeasures of Boolean Programs
- KRust: A Formal Executable Semantics of Rust
- EPMC-PAMC: A Model Checker for Probabilistic Alternating-Time Mu-Calculus
- PAMCSolver: A Satisfiability Solver for Probabilistic Alternating-Time Mu-Calculus
- YSECURE: A Machine Learning based Phishing Website Detector
- SPAIN: Security Patch Analysis for Binaries
- PuMoC: A CTL Model-Checker for Sequential Programs
- POMMADE: A PushdOwn Model-checker for MAlware DEtection

Presentations

Keynote Speeches

- Formal Verification for Side-channel Resistance of Cryptographic Programs
  The 24th International Conference on Engineering of Complex Computer Systems (ICECCS), Guangzhou, China, November 13, 2019
- Formal Verification for Side-channel Resistance of Cryptographic Programs
  Chinese Annual Conference on Mathematical Logic, Chongqing, China, November 16, 2019

Presentation of Papers

- Model Checking Pushdown Epistemic Game Structures
  The 19th International Conference on Formal Engineering Methods (ICFEM) 2017

- Verifying Pushdown Multi-Agent Systems against Strategy Logics
  The 25th International Joint Conference on Artificial Intelligence (IJCAI) 2016
- Global Model Checking on Pushdown Multi-Agent Systems
  The 30th AAAI Conference on Artifficial Intelligence (AAAI) 2016
- On Reachability Analysis of Pushdown Systems with Transductions: Application to Boolean Programs with Call-by-Reference
  The 26th International Conference on Concurrency Theory (CONCUR) 2015
- Model Checking for Android Malware Detection
  The 12th Asian Symposium on Programming Languages and Systems (APLAS) 2014
- Model Checking Dynamic Pushdown Networks
  The 11th Asian Symposium on Programming Languages and Systems (APLAS) 2013
- Pommade:Pushdown Model-Checking for Malware Detection
  The 9th joint meeting of the European Software Engineering Conference and the ACM SIGSOFT Symposium on the Foundations of Software Engineering (ESEC/FSE) 2013
- LTL Model-Checking For Malware Detection
  The 19th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2013
- PuMoC: A CTL Model-Checker For Sequential Programs
  The 27th IEEE/ACM International Conference On Automated Software Engineering (ASE) 2012
- Efficient Malware Detection Using Model-Checking
  The 18th International Symposium on Formal Methods (FM) 2012
- Pushdown Model-Checking for Malware Detection
  The 18th International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS) 2012
- Efficient CTL Model-Checking for Pushdown Systems
  The 22nd International Conference on Concurrency Theory (CONCUR) 2011

Professional Services

Organizing Committee

- Chair: National Conference on Formal Methods and Applications (FMAC 2023)
- Chair: System Software Security Track of Chinasoft, 2021
- Finance Chair: Asian Hardware Oriented Security and Trust Symposium (AsianHOST 2021)
- Chair: CCF Dragon-star course on Logic and Formal Methods, 2019
- Program co-chair: Young Researchers Workshop on Concurrency Theory (YR-CONCUR) 2018
- Publicity Chair: Symposium on Dependable Software Engineering: Theories, Tools and Applications (SETTA 2017, 2020, 2021)
- Program co-chair: Young Researchers Workshop on Formal Methods (YR-SETTA 2016)

Technical Program Committee

- Static Analysis Symposium (SAS 2023)
- Automated Technology for Verification and Analysis (ATVA 2022, 2023)
- AI Security Track of Chinasoft 2022
- Asian Hardware Oriented Security and Trust Symposium (AsianHOST 2021, 2022, 2023)
- IEEE Pacific Rim International Symposium on Dependable Computing (PRDC 2022)
- International Symposium on Software Reliability Engineering (ISSRE 2021, 2022, 2023)
- International Workshop On Security Proofs For Embedded Systems (PROOFS 2021)
- International Conference on Computer-Aided Verification (CAV 2020)
- Asia-Pacific Software Engineering Conference (APSEC 2020)
- International Conference on Verification and Evaluation of Computer and Communication Systems (VECoS

2020, 2021)
- National Software Application Conference (NASAC 2019)
- International Conference on Engineering of Complex Computer Systems (ICECCS 2019, 2020, 2021, 2022)
- International Conference on Formal Engineering Methods (ICFEM 2019)
- Symposium on Dependable Software Engineering: Theories, Tools and Applications (SETTA 2017, 2018, 2019, 2020, 2021, 2022, 2023)
- National Conference on Formal Methods and Applications (FMAC 2017, 2018, 2019, 2020, 2023)
- Young Researchers Workshop on Concurrency Theory (YR-CONCUR 2018)
- International Symposium on Theoretical Aspects of Software Engineering (TASE 2018, 2019)
- Young Researchers Workshop on Formal Methods (YR-SETTA 2015, 2016, 2017, 2018, 2019)

Professional Organization

- 2019 – Present: Member of ETAPS e.V.
- 2019 – Present: Senior Member of China Computer Federation (CCF)
- 2018 – Present: Member of CCF Technical Committee for Formal Methods
- 2016 – 2018: Member of CCF

Reviewer for Journal

- IEEE Transactions on Information Forensics and Security
- IEEE Transactions on Dependable and Secure Computing
- ACM Transactions on Programming Languages and Systems
- IEEE Transactions on Software Engineering
- IEEE Transactions on Reliability
- International Journal of Intelligent Systems
- Theoretical Computer Science
- Theory of Computing Systems
- Journal of Systems Architecture
- International Journal of Computer Science and Technology
- Formal Aspects of Computing
- Journal of Computer Security
- IEEE Access
- Frontiers of Computer Science
- Journal of Software
- Transactions on Petri Nets and Other Models of Concurrency
- Journal of Computer Research and Development

Reviewer for Conference

- Asia-Pacific Software Engineering Conference (APSEC 2022)
- International Conference on Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2021)
- IEEE/ACM International Conference on Automated Software Engineering (ASE 2019)
- International Conference on Computer-Aided Verification (CAV 2019)
- IEEE Real-Time Systems Symposium (RTSS 2018)
- Automated Technology for Verification and Analysis (ATVA 2016, 2018)
- International Conference on Logic in Computer Science (LICS 2018)
- International Colloquium on Automata, Languages, and Programming (ICALP 2018)
- International Conference on Concurrency Theory (CONCUR 2013, 2016)
- Chinese Conference on Trusted Computing and Information Security (CTCIS 2016)
- International Conference on Information and Communication Systems (ICICS 2016)
- International Colloquium on Theoretical Aspects of Computing (ICTAC 2016)

- International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI 2014, 2015)
- ACM Symposium on Applied Computing: Software Verification and Testing Track (SAC-SVT 2015)
- ACM SIGPLAN-SIGACT Symposium on Principles of Programming Languages (POPL 2014)
- International SPIN Symposium on Model Checking of Software (SPIN 2012)
- International Workshop on Automated Verification of Critical Systems (AVoCS 2012)

University Services

School Committee

- 2020 – Present: Academic Affairs Committee, School of Information Science and Technology
- 2020 – Present: Graduation Affair Committee, School of Information Science and Technology
- 2019 – Present: Co-director of Systems and Security Center, School of Information Science and Technology
- 2019 – Present: Executive Committee, School of Information Science and Technology
- 2017 – 2020: Resource Management Committee, School of Information Science and Technology
- 2016 – 2018: Recruitment and Admissions (GRA) Committee, School of Information Science and Technology
- 2016 – 2017: Academic Seminar Committee, School of Information Science and Technology

Student Admission and Advising

- Outreach for class 2021 undergraduate-admission: Ningbo, Zhejiang
- Outreach for class 2020 graduate-admission: South China University of Technology, Ningbo University
- Outreach for class 2019 graduate-admission: China University of Mining and Technology, Nanjing University
- Outreach for class 2020 undergraduate-admission: Ningbo, Zhejiang
- Outreach for class 2019 undergraduate-admission: Kunming, Yunnan
- Evaluation of applications for undergraduate-admission (2017, 2019)
- Evaluation of applications for graduate-admission (2017, 2018, 2019, 2020)
- Interview of applicants for undergraduate-admission (2017, 2018, 2019)
- Interview of applicants for graduate-admission (2017, 2018, 2019, 2020)
- Design and grading of examinations (CS) for graduate-admission (2018, 2019)
- Undergraduate advising: 38 students