

# 謝橋/Hsieh, Chiao/シエチャオ

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## RESEARCH INTEREST

Software Verification and Testing · Formal Methods · Cyber-physical System Verification

Topics: Assuring and certifying safety of cyber-physical systems containing complex or incompletely specified components. My main insight is to develop search algorithms for approximate abstractions of these components so that the approximations are tractable for existing formal verification techniques. In particular, I have been studying systems with vision-based perception, blackbox dynamics, and distributed coordination.

## COMPETITIVE RESEARCH FUNDS

科研費  
若手研究

FY 2026–2028 “Trustworthy Cyber-Physical Systems via Contracts for AI-Enabled Perception”  
Category: JSPS Grant-in-Aid for Early-Career Scientists (Grant # 26K21195)

科研費  
研スタート

FY 2024–2025 “Safety Verification of Black Box Cyber-Physical Systems via Lyapunov Stability Certificates”  
Category: JSPS Grant-in-Aid for Research Activity Start-Up (Grant # 24K23861)

## EDUCATION

CS@Illinois

2015 – 2023 Doctor of Philosophy  
**Reliable Autonomy Group** in Department of Computer Science at University of Illinois Urbana-Champaign

臺大電子所

2013 – 2015 Master of Science  
**Verification Automation & Software Testing Lab** in Graduate Institute of Electronics Engineering at National Taiwan University

臺大電機系

2007 – 2011 Bachelor of Science  
**Design Verification Lab** in Department of Electrical Engineering at National Taiwan University

## WORK EXPERIENCES

JAIST

2026 – Now Research Assistant Professor at Japan Advanced Institute of Science and Technology

京都大学  
情報学研究科

2025 – 2026 Program-Specific Assistant Professor at Graduate School of Informatics, Kyoto University  
2023 – 2024 Postdoc in **Computer Software Group** at Graduate School of Informatics, Kyoto University

CS@Illinois

2018 – 2023 Graduate RA in **Reliable Autonomy Group** at Coordinated Science Laboratory, UIUC

CS@Illinois

2017 – 2018 TA at Dept. Computer Science, UIUC

IBM Research

Summer 2016 Research Intern in **Cloud DevOps and Cognitive Platform group** at IBM Research, New York

CS@Illinois

2015 – 2017 RA in **Automated Software Engineering Group** at Dept. Computer Science, UIUC

中研院資訊所

2012 – 2015 RA in **Programming Languages and Formal Methods Group** at Inst. Information Science, Academia Sinica

海軍

2011 – 2012 Secondary Lieutenant. Compulsory Military Service at Republic of China Navy

## JOURNAL ARTICLES

- 1 “Perception Contracts for Safety of ML-Enabled Systems” **Peer-reviewed**  
Angello Astorga\*, Chiao Hsieh\*, P. Madhusudan, Sayan Mitra. *Proc. ACM on Programming Languages (PACMPL)*, vol. 7, iss. OOPSLA2, Article No. 232, Oct. 2023. doi:[10.1145/3622875](https://doi.org/10.1145/3622875)  
\*Equal contributions as co-first authors. \*This paper is accepted by OOPSLA, a CORE rank “A” conference.
- 2 “Verifying Controllers with Vision-based Perception using Safe Approximate Abstractions” **Peer-reviewed**  
Chiao Hsieh, Yangge Li, Dawei Sun, Keyur Joshi, Sasa Misailovic, Sayan Mitra. *IEEE Trans. Computer-Aided Design of*

*Integrated Circuits and Systems (TCAD)*, vol. 41, no. 11, Nov. 2022. doi:[10.1109/TCAD.2022.3197508](https://doi.org/10.1109/TCAD.2022.3197508) \*This paper is accepted by EMSOFT, a CORE rank "A" conference.

- 3 "Koord: A Language for Programming and Verifying Distributed Robotics Application." **Peer-reviewed**  
Ritwika Ghosh, [Chiao Hsieh](#), Sasa Misailovic, Sayan Mitra. *Proc. ACM on Programming Languages (PACMPL)*, vol. 4, iss. OOPSLA, Article No. 232, Nov. 2020. doi:[10.1145/3428300](https://doi.org/10.1145/3428300) \*This paper is accepted by OOPSLA, a CORE rank "A" conference.

#### CONFERENCE PUBLICATIONS

- 4 "Evaluating Hybrid Automata Learning Tools Based on Their Success in Formal Verification" **Peer-reviewed**  
Niklas Kochdumper, [Chiao Hsieh](#), Hadi Dayekh, Amit Gurung, Hidekazu Segawa, Thao Dang, Masaki Waga, Kohei Suenaga. *Proc. 34<sup>th</sup> Mediterranean Conf. Control and Automation (MED 2026)*.
- 5 "Certifying Lyapunov Stability of Black-Box Nonlinear Systems via Counterexample Guided Synthesis" **Peer-reviewed**  
[Chiao Hsieh](#), Masaki Waga, Kohei Suenaga. *Proc. 28<sup>th</sup> ACM Intl. Conf. Hybrid System: Computation and Control (HSCC 2025)*. doi:[10.1145/3716863.3718047](https://doi.org/10.1145/3716863.3718047)
- 6 "GAS: Generating Fast and Accurate Surrogate Models for Autonomous Vehicle Systems" **Peer-reviewed**  
Keyur Joshi, [Chiao Hsieh](#), Sayan Mitra, Sasa Misailovic. *Proc. 2024 IEEE 35<sup>th</sup> Intl. Symp. Software Reliability Engineering (ISSRE 2024)*. doi:[10.1109/ISSRE62328.2024.00033](https://doi.org/10.1109/ISSRE62328.2024.00033) \*ISSRE is a CORE rank "A" conference.
- 7 "Assuring Safety of Vision-based Swarm Formation Control" **Peer-reviewed**  
[Chiao Hsieh](#), Yangge Li, Yubin Koh, Sayan Mitra. *Proc. 2024 American Control Conf. (ACC 2024)*. doi:[10.23919/ACC60939.2024.10644491](https://doi.org/10.23919/ACC60939.2024.10644491)
- 8 "Industry-track: Challenges in Rebooting Autonomy with Deep Learned Perception" **Peer-reviewed**  
Michael Abraham, Aaron Mayne, Tristan Perez, Italo Romani De Oliveira, Huafeng Yu, [Chiao Hsieh](#), Yangge Li, Dawei Sun, and Sayan Mitra. *Proc. 2022 Intl. Conf. Embedded Software (EMSOFT 2022)*. doi:[10.1109/EMSOFT55006.2022.00016](https://doi.org/10.1109/EMSOFT55006.2022.00016)
- 9 "Programming Abstractions for Simulation and Testing on Smart Manufacturing Systems" **Peer-reviewed**  
[Chiao Hsieh](#), Daniel Wu, Yubin Koh, Sayan Mitra. *Proc. 18<sup>th</sup> Intl. Conf. Automation Science and Engineering (CASE 2022)*. doi:[10.1109/CASE49997.2022.9926564](https://doi.org/10.1109/CASE49997.2022.9926564)
- 10 "SkyTrakx: A Toolkit for Simulation and Verification of Unmanned Air-Traffic Management Systems." **Peer-reviewed**  
[Chiao Hsieh](#), Hussein Sibai, Hebron Taylor, Yifeng Ni, Sayan Mitra. *Proc. 2021 IEEE Intl. Intelligent Transportation Systems Conf. (ITSC 2021)*. doi:[10.1109/ITSC48978.2021.9564492](https://doi.org/10.1109/ITSC48978.2021.9564492)
- 11 "CyPhyHouse: A Programming, Simulation, and Deployment Toolchain for Heterogeneous Distributed Coordination." **Peer-reviewed**  
Ritwika Ghosh, Joao P. Jansch-Porto, [Chiao Hsieh](#), Amelia Gosse, Minghao Jiang, Hebron Taylor, Peter Du, Sayan Mitra, Geir Dullerud. *Proc. 2020 IEEE Intl. Conf. Robotics and Automation (ICRA 2020)*, doi:[10.1109/ICRA40945.2020.9196513](https://doi.org/10.1109/ICRA40945.2020.9196513)  
\*ICRA is a CORE rank "A\*" conference.
- 12 "Dione: A Protocol Verification System Built with Dafny for I/O Automata." **Peer-reviewed**  
[Chiao Hsieh](#), Sayan Mitra. *Proc. 15<sup>th</sup> Intl. Conf. integrated Formal Methods (iFM 2019)*. doi:[10.1007/978-3-030-34968-4\\_13](https://doi.org/10.1007/978-3-030-34968-4_13)
- 13 "PAC Learning-Based Verification and Model Synthesis." **Peer-reviewed**  
Yu-Fang Chen, [Chiao Hsieh](#), Ondřej Lengál, Tsung-Ju Lii, Ming-Hsien Tsai, Bow-Yaw Wang, Farn Wang. *Proc. 38<sup>th</sup> Intl. Conf. Software Engineering (ICSE 2016)*. doi:[10.1145/2884781.2884860](https://doi.org/10.1145/2884781.2884860) \*ICSE is a CORE rank "A\*" conference.
- 14 "CPArec: Verifying Recursive Programs via Source-to-Source Program Transformation - (Competition Contribution)." **Peer-reviewed**  
Yu-Fang Chen, [Chiao Hsieh](#), Ming-Hsien Tsai, Bow-Yaw Wang, Farn Wang. *Proc. 21<sup>st</sup> Intl. Conf. Tools and Algorithms for the Construction and Analysis of Systems (TACAS 2015)*. doi:[10.1007/978-3-662-46681-0\\_35](https://doi.org/10.1007/978-3-662-46681-0_35)
- 15 "Verifying Recursive Programs Using Intraprocedural Analyzers." **Peer-reviewed**  
Yu-Fang Chen, [Chiao Hsieh](#), Ming-Hsien Tsai, Bow-Yaw Wang, Farn Wang. *Proc. 21<sup>st</sup> Intl. Static Analysis Symposium (SAS 2014)*. doi:[10.1007/978-3-319-10936-7\\_8](https://doi.org/10.1007/978-3-319-10936-7_8)
- 16 "Symbolic model checking on SystemC designs." **Peer-reviewed**  
Chun-Nan Chou, Yen-Sheng Ho, [Chiao Hsieh](#), Chung-Yang (Ric) Huang. *Proc. 49<sup>th</sup> Annual Design Automation Conf. (DAC 2012)*. doi:[10.1145/2228360.2228421](https://doi.org/10.1145/2228360.2228421)

#### SERVICES AND VOLUNTEERING

- 2026 Review Committee at 2026 ACM Intl. Conf. Object-Oriented Programming, Systems, Languages & Applications  
Artifact Evaluation Committee at 27<sup>th</sup> Intl. Symp. Formal Methods (FM 2026)
- 2025 Artifact Evaluation Committee at 23<sup>rd</sup> Intl. Symp. Automated Technology for Verification and Analysis (ATVA 2025)

Artifact Evaluation Committee at 31<sup>st</sup> Intl. Symp. Model Checking Software (SPIN 2025)  
 2024 Fast Abstracts Track Committee at 35<sup>th</sup> Intl. Symp. Software Reliability Engineering (ISSRE 2024)  
 2022 Artifact Evaluation Committee at 2022 European Conf. Object-Oriented Programming (ECOOP 2022)  
 Student Volunteer at 34<sup>th</sup> Intl. Conf. Computer Aided Verification (CAV 2022)  
 2017 Student Volunteer at 32<sup>nd</sup> Intl. Conf. Automated Software Engineering (ASE 2017)

#### TEACHING EXPERIENCE

*CS@Illinois* Spring 2018 TA for CS 421 Programming Languages and Compilers  
 Fall 2017 TA for CS 527 Topics in Software Engineering  
 臺大 Summer 2015 TA for Formosan Summer School on Logic, Language, and Computation (FLOLAC 2015)

#### OTHER INFORMATION

*Presentations* 2021 · 15 min. presentation for SkyTrakx at ITSC 2021  
 2020, 2021 · 20 min. presentation for Koord at OOPSLA 2020 and SPLASH 2021  
 2019 · 30 min. presentation for Dione at iFM 2019  
 2015 · 5 min. tool paper presentation at TACAS 2015  
 2014 · 20 min. research paper presentation at SAS 2014

*Languages* CHINESE · Mother tongue  
 ENGLISH · Professionally Fluent  
 JAPANESE · Limited Working Proficiency (can have conversations and reply emails without AI assistance)