

SHUO YANG

Email: yangsl@seas.upenn.edu

Homepage: <https://shuoyang2000.github.io>

Phone: 267-470-9839

RESEARCH INTEREST

Formal Methods; Robotics; Learning; Control

EDUCATION

University of Pennsylvania

Ph.D. in Electrical and Systems Engineering
xLAB for Safe Autonomous Systems

Aug. 2021 - present

Advisor: Prof. [Rahul Mangharam](#)

Shanghai Jiao Tong University

B.Eng. in Automation

Thesis: Verification and synthesis of opacity for cyber-physical systems [\[pdf\]](#)

Outstanding Bachelor Thesis Award of SJTU

Sept. 2017 - June. 2021

Advisor: Prof. [Xiang Yin](#)

Duke University

Visiting Student

June. 2020 - Oct. 2020 (Remote)

Advisor: Prof. [Michael Zavlanos](#)

PUBLICATIONS

(* indicates equal contribution) [\[Google Scholar\]](#)

1. Jiangwei Wang, Shuo Yang, Ziyang An, Songyang Han, Zhili Zhang, Meiyi Ma, Fei Miao. "Multi-Agent Reinforcement Learning Guided by Signal Temporal Logic Specifications." *Conference on Neural Information Processing Systems (NeurIPS)*, submitted, 2023. [\[pdf\]](#)
2. Shuo Yang, George J. Pappas, Rahul Mangharam, Lars Lindemann. "Safe Perception-Based Control under Stochastic Sensor Uncertainty using Conformal Prediction." *IEEE Conference on Decision and Control (CDC)*, submitted, 2023. [\[pdf\]](#)
3. Xiatao Sun*, Shuo Yang*, Rahul Mangharam. "MEGA-Dagger: Imitation Learning with Multiple Imperfect Experts." *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, submitted, 2023. [\[pdf\]](#)
4. Zhijie Qiao, Xiatao Sun, Shuo Yang, Helen Loeb, Rahul Mangharam. "Autonomous Vehicle Education Using a Virtual Reality Driving Simulator." *CPS-IoT Week Humans in Cyber-Physical Systems Workshop*, 2023.
5. Yu Chen*, Shuo Yang*, Rahul Mangharam, Xiang Yin. "You Don't Know When I Will Arrive: Unpredictable Controller Synthesis for Temporal Logic Tasks." *22nd IFAC World Congress (IFAC WC)*, 2023. [\[pdf\]](#)
6. Hongrui Zheng*, Zirui Zang*, Shuo Yang*, Rahul Mangharam. "Towards Explainability in Modular Autonomous Vehicle Software." *IEEE Intelligent Vehicles Symposium (IV)*, 2023. [\[pdf\]](#)
7. Xiatao Sun, Mingyan Zhou, Zhijun Zhuang, Shuo Yang, Johannes Betz, Rahul Mangharam. "A Benchmark Comparison of Imitation Learning-based Control Policies for Autonomous Racing." *IEEE Intelligent Vehicles Symposium (IV)*, 2023. [\[pdf\]](#)
8. Shuo Yang*, Shaoru Chen*, Victor M. Preciado, Rahul Mangharam. "Differentiable Safe Controller Design through Control Barrier Functions." *IEEE Control Systems Letters (L-CSS)*, 2022. [\[pdf\]](#)
9. Shuo Yang, Xiang Yin. "Secure Your Intention: On Notions of Pre-Opacity in Discrete-Event Systems." (Full Paper), *IEEE Transactions on Automatic Control (TAC)*, 2022. [\[pdf\]](#)

10. Shuo Yang*, Junyao Hou*, Xiang Yin, Shaoyuan Li. “Opacity of Networked Supervisory Control Systems over Insecure Communication Channels.” *IEEE Transactions on Control of Network Systems (TCNS)*, 2021. [\[pdf\]](#)
11. Shuo Yang, Xiang Yin, Shaoyuan Li, Majid Zamani. “Secure-by-Construction Optimal Path Planning for Linear Temporal Logic Tasks.” *IEEE Conference on Decision and Control (CDC)*, 2020. [\[pdf\]](#)

TALKS AND PRESENTATIONS

1. CPS-IoT Week Humans in CPS Workshop, May 2023
MEGA-Dagger: Imitation Learning with Multiple Imperfect Experts
2. CPS-IoT Week Humans in CPS Workshop, May 2023
Autonomous Vehicle Education Using a Virtual Reality Driving Simulator
3. RTSS Explainability Workshop, Dec 2022
Towards Explainability in Modular Autonomous Vehicle Software
4. University of Michigan, Nov 2022
Opacity in Discrete Event Systems: Notions, Algorithms, and Applications
5. 59th IEEE Conference on Decision and Control (CDC), Dec 2020
Secure-by-Construction Optimal Path Planning for Linear Temporal Logic Tasks

SELECTED HONORS AND AWARDS

ACC Student Travel Grant	2023
The Dean’s Fellowship from University of Pennsylvania	2021
Solomon M. Swaab Fellowship from University of Pennsylvania	2021
Outstanding Graduate of SJTU	2021
Outstanding Bachelor Thesis Award of SJTU (top 1%)	2021
Person of the Year of SJTU (highest honor for SJTU students)	2020
COMAP Meritorious Winner in Mathematical Contest in Modelling (top 7.09%)	2020
3rd Prize of National College Student Physics Competition	2020
Excellent Academic Scholarship from SJTU	2018, 2019
3rd Prize of National High School Mathematics Competition	2016

ACADEMIC SERVICES

Program Committee	International Conference on Cyber-Physical Systems 2023
Reviewer	American Control Conference International Conference on Learning Representations IEEE Conference on Decision and Control IEEE Transactions on Automatic Control IEEE Transactions on Intelligent Vehicles Nonlinear Analysis: Hybrid Systems etc.

RESEARCH AND WORKING EXPERIENCES

University of Pennsylvania, Dept. Electrical & Systems Engineering Aug. 2021 - Present
Research Assistant Philadelphia, USA

My research focuses on the intersection of learning, control, and formal methods. I am interested in the following directions:

- Learning-based safe control for autonomous system

- Building formal method guided trustworthy and reliable AI system
- Perception-based robust planning and control
- Formal verification and synthesis for discrete-events systems

Shanghai Jiao Tong University, Dept. Automation

Research Assistant

Mar. 2019 - June 2021

Shanghai, China

- My research focuses on the security properties in cyber-physical systems and robot path planning
- Security property analysis over insecure multiple channel networks
- Optimal robot path planning for high-level tasks under security constraint
- Intention-security property analysis in discrete-event systems

Duke University, Dept. Mechanical Engineering & Materials Science

Visiting Research Assistant

June 2020 - Oct. 2020
Durham, USA (remote)

- Optimal secure trajectory planning for heterogeneous multi-robot using Petri nets model
- Control synthesis for hiding robot's tasks expressed by temporal logic formula

TEACHING EXPERIENCES

Teaching Assitant

Discrete Mathematics MA 238 (Instructor: Prof. Xiang Yin)

Fall 2020, SJTU

Lecturer

Mathematics Competition

Summer 2018, High School Affiliated to SJTU

SELECTED ACTIVITY EXPERIENCES

Global Education and Training at University of Illinois at Urbana-Champaign

2019

Volunteer of the Shanghai International Marathon

2018, 2019

LANGUAGE, SKILLS AND INTERESTS

Language

Chinese (native), English (fluent), French (basic)

Programming

Python, C++, MATLAB, Verilog, HTML

Interests

Basketball, Literature, Music, Board Games, Video Games, etc.

Last update: May 2023