

## RESEARCH INTERESTS

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My primary research focuses on the convergence of optimization, machine learning, control theory, and formal verification, with the overarching aim of bolstering the reliability of safety-critical cyber-physical systems deployed in real-world scenarios. I actively engage in collaborative projects that span a diverse range of cyber-physical systems, including but not limited to autonomous driving and racing cars, quadrotors, lower-limb exoskeletons, manipulators, and industrial control systems.

## EDUCATION

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<b>Delft University of Technology</b>	Delft, the Netherlands
Ph.D. in Computer Science, Advisors: Prof. Sicco Verwer, Prof. Jan van den Berg	2015–2019
– Dissertation: “Intelligent Control Systems: Learning, Interpreting, Verification”	
– Funded by Dutch Government Projects: VENI project MANTA & NWO project LEMMA	
<b>Tongji University</b>	Shanghai, China
M.Eng. in Control Theory and Control Engineering, Advisor: Prof. Jun Wang	2011–2014
– Thesis: “Research on Methods for Processing Wind Speed Data of Wind Farms”	
<b>Hefei University of Technology</b>	Hefei, China
B.Eng. in Automation	2007–2011

## APPOINTMENTS

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<b>Department of Computer Science, Cleveland State University</b>	Cleveland, USA
Tenure-track Assistant Professor	Jan 2022–Present
<b>Robotics Institute, Carnegie Mellon University</b>	Pittsburgh, USA
Postdoc Research Fellow, Advisor: Prof. John M. Dolan	May 2019–Dec 2021
– Funded by DARPA Assured Autonomy project	
– Topic: Safety verification for learning-enabled components of autonomous vehicles	

## PUBLICATIONS

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[Google scholar link](#)

### Journal Papers

1. D. Kalaria\*, Q. Lin, and J. M. Dolan, “Delay-aware Robust Control for Safe Autonomous Driving and Racing,” accepted to IEEE Transactions on Intelligent Transportation Systems, 2023
2. Q. Lin, S. Mitsch, A. Platzer, and J. M. Dolan, “Safe and resilient practical waypoint-following for autonomous vehicles,” IEEE Control Systems Letters, vol. 6, pp. 1574–1579, 2021.
3. S. Khaitan\*, Q. Lin, and J. M. Dolan, “Safe planning and control under uncertainty for self-driving,” IEEE Transactions on Vehicular Technology, vol. 70, no. 10, pp. 9826–9837, 2021

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\* supervised students

4. **Q. Lin**, Y. Zhang, S. Verwer, and J. Wang, “Moha: A multi-mode hybrid automaton model for learning car-following behaviors,” *IEEE Transactions on Intelligent Transportation Systems*, vol. 20, no. 2, pp. 790–796, 2018.
5. Y. Zhang, **Q. Lin**, J. Wang, S. Verwer, and J. M. Dolan, “Lane-change intention estimation for car-following control in autonomous driving,” *IEEE Transactions on Intelligent Vehicles*, vol. 3, no. 3, pp. 276–286, 2018.
6. H. Gu, J. Wang, **Q. Lin**, and Q. Gong, “Automatic contour-based road network design for optimized wind farm micro-siting,” *IEEE Transactions on Sustainable Energy*, vol. 6, no. 1, pp. 281–289, 2014.
7. **Q. Lin** and J. Wang, “Vertically correlated echelon model for the interpolation of missing wind speed data,” *IEEE Transactions on Sustainable Energy*, vol. 5, no. 3, pp. 804–812, 2014.

## Conference Papers

1. D. Kalaria\*, **Q. Lin**, and J. M. Dolan, “Online Adaptive Compensation of Time-varying Tire Models for Autonomous Racing using Extreme Learning Machine,” accepted to IEEE International Conference on Robotics and Automation (ICRA), 2024
2. C. McGuan\*, C. Yu, and **Q. Lin**, “Towards low-barrier cybersecurity research and education for industrial control systems,” in 2023 IEEE International Conference on Intelligence and Security Informatics (ISI). IEEE, 2023, pp. 1–6.
3. J. Chen\*, Z. Gao, and **Q. Lin**, “Robust control barrier functions for safe control under uncertainty using extended state observer and output measurement”, accepted to IEEE Conference on Decision and Control (CDC) 2023.
4. D. Kalaria\*, **Q. Lin**, and J. M. Dolan, “Towards safety assured end-to-end vision-based control for autonomous racing”, accepted to the 22nd World Congress of the International Federation of Automatic Control (IFAC), 2023, Accepted.
5. S. Deolasee\*, **Q. Lin**, J. Li, and J. M. Dolan, “Spatio-temporal motion planning for autonomous vehicles with trapezoidal prism corridors and bezier curves,” in 2023 American Control Conference (ACC). IEEE, 2023, pp. 3207–3214.
6. E. Munoz\*, D. Kalaria, **Q. Lin**, and J. M. Dolan, “Online adaptive compensation for model uncertainty using extreme learning machine-based control barrier functions,” in 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022, pp. 10 959–10 966.
7. J. Li\*, X. Xie, **Q. Lin**, J. He, and J. M. Dolan, “Motion planning by search in derivative space and convex optimization with enlarged solution space,” in 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2022, pp. 13500–13507.
8. D. Kalaria\*, **Q. Lin**, and J. M. Dolan, “Delay-aware robust control for safe autonomous driving,” in 2022 IEEE Intelligent Vehicles Symposium (IV). IEEE, 2022, pp. 1565–1571 (selected for oral presentation, top %10)
9. O. Jahanmahin\*, **Q. Lin**, Y. Pan, and J. M. Dolan, “Jerk-minimized CILQR for human-like driving on two-lane roadway,” in 2021 IEEE Intelligent Vehicles Symposium (IV). IEEE, 2021, pp. 1282–1289.
10. **Q. Lin**, S. Verwer, and J. Dolan, “Safety verification of a data-driven adaptive cruise controller,” in 2020 IEEE Intelligent Vehicles Symposium (IV). IEEE, 2020, pp. 2146–2151.
11. Y. Pan\*, **Q. Lin**, H. Shah, and J. M. Dolan, “Safe planning for self-driving via adaptive constrained ILQR,” in 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2020, pp. 2377–2383.
12. **Q. Lin**, X. Chen, A. Khurana, and J. M. Dolan, “Reachflow: An online safety assurance framework for waypoint-following of self-driving cars,” in 2020 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS). IEEE, 2020, pp. 6627–6632.
13. **Q. Lin**, W. Wang, Y. Zhang, and J. M. Dolan, “Measuring similarity of interactive driving behaviors using matrix profile,” in 2020 American Control Conference (ACC). IEEE, 2020, pp. 3965–3970.
14. **Q. Lin**, S. Verwer, R. Kooij, and A. Mathur, “Using datasets from industrial control systems for cyber security research and education,” in Critical Information Infrastructures Security: 14th International Conference, CRITIS 2019, Springer, 2020, pp. 122–133

15. **Q. Lin**, S. Adepur, S. Verwer, and A. Mathur, “Tabor: A graphical model-based approach for anomaly detection in industrial control systems,” in Proceedings of the 2018 on Asia conference on computer and communications security, 2018, pp. 525–536. (acceptance rate: 62/320=20%)
16. G. Pellegrino, C. Hammerschmidt, **Q. Lin**, and S. Verwer, “Learning deterministic finite automata from infinite alphabets,” in International Conference on Grammatical Inference. PMLR, 2017, pp. 120–131.
17. G. Pellegrino, **Q. Lin**, C. Hammerschmidt, and S. Verwer, “Learning behavioral fingerprints from netflows using timed automata,” in 2017 IFIP/IEEE Symposium on Integrated Network and Service Management (IM). IEEE, 2017, pp. 308–316. (acceptance rate: 44/154=28.6%)
18. Y. Zhang, J. Wang, **Q. Lin**, S. Verwer, and J. M. Dolan, “A data-driven behavior generation algorithm in car-following scenarios,” in Dynamics of Vehicles on Roads and Tracks Vol 1. CRC Press, 2017, pp. 227–232.
19. Y. Zhang, **Q. Lin**, J. Wang, and S. Verwer, “Car-following behavior model learning using timed automata,” IFAC-PapersOnLine, vol. 50, no. 1, pp. 2353–2358, 2017.
20. **Q. Lin**, J. Wang, and W. Qiao, “Denoising of wind speed data by wavelet thresholding,” in 2013 Chinese Automation Congress. IEEE, 2013, pp. 518–521.

### Workshop Papers

1. X. Liu\*, **Q. Lin**, S. Verwer, and D. Jarnikov, “Anomaly Detection in a Digital Video Broadcasting System Using Timed Automata,” Thirty-Second Annual ACM/IEEE Symposium on Logic in Computer Science (LICS) Workshop on Learning and Automata (LearnAut), 2017
2. **Q. Lin**, C. Hammerschmidt, G. Pellegrino, and S. Verwer, “Short-term Time Series Forecasting with Regression Automata,” ACM SIGKDD 2016 Workshop on Mining and Learning from Time Series (MiLeTS)
3. C. Hammerschmidt, S. Verwer, and **Q. Lin**, “Interpreting Finite Automata for Sequential Data,” Interpretable Machine Learning for Complex Systems: NIPS 2016 workshop proceedings

### Manuscripts

1. F. Zhang\*, J. Chen, Y. Hu, Z. Gao, G. Lv, and **Q. Lin**, “Learning-Enabled Extended State Observer-Based Control for Unknown Dynamics,” invited for submission to IEEE CASE, 2024
2. J. Zhou, Q. Fang, H. Zhu, Y. Wang, **Q. Lin**, “Queue Modeling and Simulation for a Large-scale Municipal Domestic Waste Transfer Station,” submitted to Expert Systems with Applications, under revision
3. S. S. Kumar\*, **Q. Lin**, and J. M. Dolan, “LatentCBF: A Control Barrier Function in Latent Space for Safe Control,” submitted to International Conference on Learning Representations (ICLR), 2024
4. D. Kalaria\*, **Q. Lin**, and J. M. Dolan, “Towards Optimal Head-to-head Autonomous Racing with Curriculum Reinforcement Learning,” submitted to International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2024
5. M. Yu, **Q. Lin**, and G. Lv, “Safety Augmentation for Volitional Human Locomotion via Lower-Limb Exoskeletons: A Case Study on Balance Control,” submitted to IEEE Control Systems Letters (L-CSS)
6. F. Zhang\*, J. Chen, Z. Gao, and **Q. Lin**, “Feedback Planning for Largely Unknown Inner-Loop Controller and Dynamics,” invited for submission to IEEE CASE, 2024
7. J. Chen\*, F. Zhang, Z. Gao, and **Q. Lin**, “Robust Fault-Tolerant Quadrotor Control Subject to Complete Loss of Two Opposing Rotors,” under preparation
8. J. Ye, Q. Fang, Y. Wang, and **Q. Lin**, “Viewpoints Planning for Active 3-D Reconstruction of Profiled Blades based on DDPG,” under preparation

## HONORS AND AWARDS

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- Winner of the Competition for Motion Planning of Autonomous Vehicles (ITSC 2021), with Shivesh Khaitan and John M. Dolan [Winner Announcement]
- First Place of the 2023 Senior Design Competition of Engineering College CSU, Supervisor: Qin Lin; Students: Ken Bender, Russell Burttriss, and Shereen Elfadil; Project: Autonomous Nursery Cart [Video]

## GRANTS

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- NSF, *ERI: Operator-Automation Shared Protection for Security and Safety Assured Industrial Control Systems: Learning, Detection, and Recovery Control*, #2301543, \$200,000, 2023-2025, sole-PI
- Ohio Cyber Range Institute, subaward, *Detecting Spoofing Attacks in Industrial Control Systems Using Machine Learning in Simulated and Low-cost Real Testbeds*, \$10,000, 2023, PI
- U.S. Department of Education, Modeling and Simulation Program, *Building A Modeling and Simulation-Based Multidisciplinary Learning Environment for Capacity Transformation in Urban Universities: Sustainable Energy Systems and Beyond*, \$1,009,852, 2023-2025, co-PI (PI: Yongxin Tao, other co-PIs: Wenbing Zhao and Navid Goudarzi)

## PROFESSIONAL SERVICE

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### Editorial Board

- Associate Editor, IEEE Transactions on Vehicular Technology (TVT), Sep-2023 - Present
- Associate Editor, IEEE Robotics and Automation Letters (RA-L), Dec-2022 - Present
- Associate Editor, Journal of Computer Science and Technology (JCST), Jun-2022 - Present
- Associate Editor, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2023, 2024

### Program Committee

- AAAI Student Abstract and Poster Program (2022, 2023)
- International Workshop on Artificial Intelligence and Industrial Internet-of-Things Security (AIoTS), in conjunction with 20th International Conference on Applied Cryptography and Network Security (ACNS 2022)
- Workshop of Impact of IT/OT Convergence on the Resilience of Critical Infrastructures (IOCRCI), in conjunction with 2023 IFIP Networking Conference
- 4th International Workshop on Critical Infrastructure and Manufacturing System Security (CIMSS)

### Dissertation Committee

- Miao Yu (doctoral, Clemson University)
- Jinfeng Chen (doctoral, CSU)
- Asanka K. Mananayaka (doctoral, CSU)
- Chengfeng Zhao (doctoral, Tongji University)

### Grant Panelist

- NASA (2022)
- NSF (2024)

### Journal Reviewing

- Machine Learning
- IEEE Transactions on Intelligent Transportation Systems (TITS)

- IEEE Transactions on Vehicular Technology (TVT)
- IEEE Transactions on Intelligent Vehicles (TIV)
- IEEE Transactions on Human-Machine Systems (THMS)
- IEEE Robotics and Automation Letters (RA-L)
- IEEE Transactions on Automation Science and Engineering (TASE)
- IEEE Transactions on Dependable and Secure Computing (TDSC)
- IEEE Transactions on Sustainable Energy (TSE)
- Renewable Energy
- IET Renewable Power Generation
- Control Theory and Technology
- Field Robotics
- Journal of Computer Science and Technology (JCST)

### Conference Reviewing

- ACM Symposium on Applied Computing (SAC)
- European Conference on Artificial Intelligence (ECAI)
- International Joint Conference on Artificial Intelligence (IJCAI)
- Association for the Advancement of Artificial Intelligence (AAAI)
- IEEE International Conference on Robotics and Automation (ICRA)
- IFIP/IEEE Symposium on Integrated Network and Service Management (IM)
- International Conference on the Integration of Constraint Programming, Artificial Intelligence, and Operations Research (CPAIOR)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE Intelligent Vehicle Symposium (IV)
- American Control Conference (ACC)
- IEEE Conference on Decision and Control (CDC)
- IFAC World Congress
- International Workshop on Artificial Intelligence and Industrial Internet-of-Things Security (AIoTS)

### University Services

- Engineering College Nominating Committee

### TEACHING

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- **Teaching Assistant**, Delft University of Technology Cyber Data Analytics (CS4035), 2015-2018  
- published **one pedagogy paper** [Lin et al., CRITIS 2019] discussing how to design a project-centric cyber security graduate course.
- Lecture, CIS390/550, Introduction to Algorithms, CSU
- Lecture, CIS492, Machine Learning, CSU

## ADVISING

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- Fan Zhang, Ph.D. student, CSU
- Jinfeng Chen, Ph.D. student, co-supervised with Prof. Zhiqiang Gao, CSU
- Colman McGuan, MSc, co-supervised with Prof. Chansu Yu, CSU (initial career: Pressco Technology Inc.)
- Xiaoran Liu, MSc, *Thesis: Anomaly Detection in a Digital Video Broadcasting System Using Timed Automata*, TU Delft (initial career: Rabobank)
- Kaixin Ding, Msc, *Thesis: Real-time Intrusion Detection of Cyber-Physical Systems*, TU Delft (initial career: NXP)
- Alvin Shek, undergraduate research assistant, CMU (initial career: CMU MSR)
- Jialun Li, remote research assistant, CMU (initial career: DJI)
- Shivesh Khaitan, RISS intern & MSR, CMU (initial career: InstaDeep)
- Dvij Kalaria, RISS intern & MSR, CMU
- Srujan Deolasee, RISS intern & MSR, CMU
- Emanuel Munoz, RISS intern, CMU (initial career: CMU MSR)

## REFEREES

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Available upon request