

# ZETIAN ZHANG

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## 🐾 EMPLOYMENT

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**SAIC Motor Innovation Center USA** San Jose, CA 2019 Feb. - Present

*Motion Planning Research Engineer*

Tech lead development of motion planning module for L4 autonomous driving

- Formulated and implemented route planning and trajectory planning/optimization algorithm for L4 autonomous vehicles - related algorithm: A\*, RRT\*, iLQR, sequential convex programming
- Co-developed decision making algorithm/module for urban driving features such as stop sign intersections, traffic lights, nudging and lane change etc.
- Co-developed vehicle motion prediction module
- Research and prototype state-of-the-art motion planning algorithms for autonomous driving
- Analyze log data, test algorithms in simulation environment, followed by benchmarking and validating the system with on-field testing in downtown San Jose and UC Davis campus over 2000 miles, no disengagement caused by motion planning stack and overall delivered 50x improvement in disengagement rate in 2019 over 2018 to 56 miles/disengagement.

**Worcester Polytechnic Institute** Worcester, MA 2013 - 2018

*Research Assistant*

Advised by Prof. Raghvendra V. Cowlagi

- Research focus on motion/task planning for autonomous vehicles
- Developed a hierarchical motion planning & task planning algorithms for multiple unmanned vehicles - path planning considering vehicle dynamics and to satisfy linear temporal logic specifications.
- Partnership with Aurora Flight Sciences (a Boeing Company) and delivered a path/task planner for fixed wing airplane.
- Teach Assistant: Optimal Control, Motion Planning, Statics, Fluid Dynamics, Formal Methods, etc.

**SAIC Motor Innovation Center USA** San Jose, CA 2018 May - 2018 Sept.

*Research Intern*

Path planning and decision making for L4 autonomous driving

- Formulated and implemented path/trajectory optimization algorithm
- Developed multiple decision making policies for autonomous driving in urban scenario

**CoolChip Technologies Inc.** Boston, MA 2014

*Research Intern*

Mentored by Dr. Lino Gonzalez

- Co-developed/designed and tested a cooling system for CPU of Xbox
- Cooling system computational simulation and tests

## 🎓 EDUCATION

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**Worcester Polytechnic Institute**, Worcester, MA 2018 Sept.

*Ph.D.* in Aerospace Engineering, **GPA: 3.93/4.0** **Research Focus:** Intelligent Motion Planning

*M.S.* in Mechanical Engineering, **GPA: 4/4.0** **Research Focus:** Computational Fluid Dynamics

**University of Shanghai for Science and Technology**, Shanghai, China 2011 Aug.

Double *B.S.* in Energy and Thermal Engineering and Computer Science

**Udacity Deep Learning Nanodegree** 2018

## 📖 PUBLICATION

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- **Zetian Zhang**, Du Ruixiang, Raghvendra V. Cowlagi. Randomized Sampling-based Trajectory Optimization for UAVs to Satisfy Linear Temporal Logic Specifications. *Aerospace Science and Technology*, 2020
- Jie Fang, **Zetian Zhang**, Raghvendra V. Cowlagi. Decentralized Route-Planning for Multi-Vehicle Teams to Satisfy Temporal Logic Specifications. *IEEE Transactions on Automation Science and Engineering*, 2019
- **Zetian Zhang**, Raghvendra V. Cowlagi. A Fast Sampling-based Optimal Route-Planning Algorithm to Satisfy Linear Temporal Logic Specifications. *Guidance, Navigation, and Control Conference*, 2018
- Jie Fang, **Zetian Zhang**, Raghvendra V. Cowlagi. Decentralized Route-Planning to Satisfy Global Linear Temporal Logic Specifications on Multiple Aircraft. *Guidance, Navigation, and Control Conference*, 2018
- Raghvendra V. Cowlagi, **Zetian Zhang**. Route Guidance for Satisfying Temporal Logic Specifications on Aircraft Motion. *Journal of Guidance, Control, and Dynamics*, 2016
- **Zetian Zhang**, Raghvendra V. Cowlagi. Motion-planning with Global Temporal Logic Specifications for Multiple Nonholonomic Robotic Vehicles. *American Control Conference (ACC)*, 2016
- Raghvendra V. Cowlagi, **Zetian Zhang**. Motion-planning with Temporal Logic Specifications for a Non-holonomic Vehicle Kinematic Model *American Control Conference (ACC)*, 2016
- **Zetian Zhang**, Raghvendra V. Cowlagi. Incremental Path Repair in Hierarchical Motion-Planning with Dynamical Feasibility Guarantees for Mobile Robotic Vehicles *Control Conference (ECC)*, 2015 *European*.

## ⚙️ SKILLS

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- Knowledge Base: motion planning, path planning, trajectory planning, behavior planning, trajectory optimization, autonomous driving, control theory, optimal control, model predictive control, formal methods
- Programming Languages: C++, Python, MATLAB
- Development: Linux, ROS, V-REP, Pytorch, OpenCV, SolidWorks, git
- Publication list and other projects on personal website: [zetian.me](http://zetian.me)