

# Yiming Zhang

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## OBJECTIVE

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- Seeking a Ph.D. program in the field of robotics with a focus on autonomous systems, machine learning for robotics, and advanced control algorithms to contribute to cutting-edge research and development in robotic technologies.

## EDUCATION

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<b>University of Michigan</b>	<b>Ann Arbor, MI</b>	Dec. 2014
M.S.E in Aerospace Engineering	<b>GPA: 3.79/4.00</b>	
Courses: Feedback Control, Linear Systems, Intermediate Dynamics		

<b>Beihang University</b>	<b>Beijing, China</b>	Jul.2013
B.S. Aeronautics Science and Engineering	<b>GPA: 3.87/4.00</b>	

## Positions

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<b>Senior Software Engineer</b>	<b>Motional</b>	May.2018-Present
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- **Vehicle Lateral Tracker Design:** Designed an LQI-based steering controller and built an observer to estimate transient tire dynamics, enhancing vehicle tracking performance and robustness to unknown disturbances.
- **Vehicle State Estimation:** Developed an extended Kalman filter to estimate lateral velocity and a steady-state Kalman filter for angular acceleration, improving vehicle state estimation accuracy.
- **System Design:** Designed a system to manage the operational states of various vehicle actuators, including the steering system, propulsion system, and brake system.
- **Controller Simulation (Software/Hardware in the Loop):** Integrated vehicle model and controller, simulating vehicle feedback signals using a mock device, streamlining the testing process.
- **Override Detection:** Developed steering override detection logic based on human driver steering torque input.
- **Diagnostics:** Created an error detection and monitoring system for various control signals.

<b>Application Engineer</b>	<b>American Mitsuba Corporation</b>	Feb.2015-May.2018
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- **Power Sliding Door and Tailgate Controllers:** Tuned controllers under various inclination and thermal conditions.
- **Testing:** Conducted vehicle tests and hardware-in-the-loop tests under different inclination and thermal conditions.
- **Technical Proficiency:** Experienced in CAN communication, microprocessors, oscilloscopes, PLC (RSLogix 5000), and various sensors and tools.

## Publications and Patents

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- Zhang, Yiming, Ludong Sun, and Ahmed El Shaer. "Vehicle control time delay compensation." U.S. Patent Application 17/526,195, filed May 18, 2023.
- Qin, Wubing B., Yiming Zhang, Dénes Takács, Gábor Stépán, and Gábor Orosz. "Nonholonomic dynamics and control of road vehicles: moving toward automation." Nonlinear Dynamics 110, no. 3 (2022): 1959-2004.

## Personal Projects

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### Drone simulator

- Developed a Python drone simulation in 3D space, applying control algorithms in aerial robotics.
- Replicated a trajectory tracking controller and a minimum snap trajectory generator.
- (Work in progress) Replicating a meta-learning based adaptive controller under unknown disturbance, exploring cutting-edge adaptive control methods.

### Vehicle simulation

- Built a vehicle model (dynamic bicycle model) to track a trajectory in a Simulink environment.
- Integrated Pacejka's tire model and designed an LQR controller for both longitudinal and lateral control, showcasing comprehensive vehicle dynamics understanding.

<b>Autonomous Rover (course project)</b>	<b>Coursera</b>	Oct.2017-Dec.2017
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- Built an autonomous rover to navigate in environment with obstacles.
- Integrated Raspberry Pi (ROS environment), IMU, and camera for rover sensing and control.
- Coded motion planning algorithm(Dijkstra's algorithm) and Extended Kalman Filter in Python.
- Acquired the foundations of robot motion planning, perception, estimation and localization.

**Dynamic Vehicle Steering Design (MSE Thesis)****University of Michigan**

Jan.2014-Dec.2014

Y. Zhang: *Nonholonomic models for automobile steering*, MSc Thesis, University of Michigan, 2014

- Developed a steering model to predict the motion of a vehicle using Lagrangian and Appellian frame works
- Simulated vehicle path following maneuver using a feedback controller

**Certifications**

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- *UL Certified Functional Safety Professional* by UL Solutions
- *Robotics Specialization* by University of Pennsylvania on Coursera
- *Machine Learning* by Stanford University on Coursera