

Zhouqiao Zhao

Ph.D. Student in Electrical Engineering
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EDUCATION

Ph.D. in Electrical Engineering Sep. 2018 - Present

University of California, Riverside

Advisors: Dr. Matthew J. Barth, Professor, Electrical and Computer Engineering

Dr. Guoyuan Wu, Assistant Adjunct Professor, Electrical and Computer Engineering

Research Interests: V2X Applications, Cooperative Motion Control and Formation Control using CAV technology

M.S. in Electrical and Computer Engineering Sep. 2015 – May 2017

The Ohio State University, Columbus, OH

Specialization: Intelligent Transportation, Control Theory, Computer Vision

B.S. in Electronic and Information Engineering Sep. 2012 – May 2015

University of Electronic Science and Technology of China, Sichuan, China

Specialization: Signal Processing and Basic Digital & Artificial Circuit, Image Processing, Information Theory, Radar System

Scholarships: Second Ranking Scholarship, Third Ranking Scholarship

Honors: Outstanding Undergraduate of School of Electronic Engineering, Outstanding Leader of Student Union of School of Electronic Engineering.

QUALIFICATIONS

Programming Languages: MATLAB, C++, Python, C#, HTML

Software or Platforms: MATLAB/Simulink, ROS, PTV VISSIM, SUMO, Gurobi, Visual Studio, Anaconda, Git, Arduino

PROFESSIONAL EXPERIENCE

Graduate Student Researcher Sep. 2018 - Present

Transportation Systems Research Laboratory, Center for Environmental Research and Technology, UCR

- Participated in multiple projects and research on multiple intelligent transportation topics, including cooperative ramp control, ridesharing, plug-in hybrid electric bus (PHEB) modeling and control design, and mini-scale smart city

Research Intern Mar. 2018 – Jun. 2018

Intelligent Driving Research Group, Tsinghua Unigroup Co. Ltd., Beijing, China

- Conducted technology pre-research on advanced driver assistance systems (ADAS)

Research Assistant Jun. 2017 – Jan. 2018

Control and Intelligent Transportation Research Laboratory, Department of Electrical and Computer Engineering, OSU

- Participated in the F1/10 Autonomous Racing
- Participated in the project of UAV-based soil moisture mapping project
- Assisted with the management of Laboratory day-to-day affairs

Research Assistant Sep. 2016 – May 2017

Dr. Benjamin Coifman's Laboratory, Department of Electrical and Computer Engineering, OSU

- Conducted research on traffic surveillance and modeling using image processing techniques

PUBLICATIONS

Papers Under Review

Optimal Control-Based Eco-Ramp Merging System for Connected and Automated Electric Vehicles

- [Zhouqiao Zhao](#), Guoyuan Wu, Ziran Wang, and Matthew J. Barth
- 2020 IEEE Intelligent Vehicles Symposium, Las Vegas, NV, United States, Jun. 2020

Demand-Side Cooperative Shared and Automated Mobility Service: A Dynamic Microscopic Simulation Framework and Case Study

- Lei Zhu, [Zhouqiao Zhao](#), and Guoyuan Wu
- IEEE Transactions on Intelligent Transportation Systems

Developing a Data-driven Modularized Model for Plug-in Hybrid Electric Bus (PHEB)

- [Zhouqiao Zhao](#), Zhensong Wei, Guoyuan Wu, Matthew J. Barth
- IEEE 23rd International Conference on Intelligent Transportation Systems, Rhodes, Greece, Sep. 2020

Papers Published or Accepted

The State-of-the-art of Coordinated Ramp Control with Mixed Traffic Conditions

- [Zhouqiao Zhao](#), Ziran Wang, Guoyuan Wu, and Matthew J. Barth
- IEEE 22nd International Conference on Intelligent Transportation Systems, Auckland, New Zealand, Oct. 2019

Development of Eco-Friendly Ramp Control for Connected and Automated Electric Vehicles

- Guoyuan Wu, [Zhouqiao Zhao](#), Ziran Wang, and Matthew J. Barth
- National Center for Sustainable Transportation Research Reports

Dyno-in-the-Loop: An Innovative Hardware-in-the-Loop Development and Testing Platform for Emerging Mobility Technologies

- Guoyuan Wu, Dylan Brown, [Zhouqiao Zhao](#), Peng Hao, Michael Todd, Kanok Boriboonsomsin, Matthew J. Barth, Zhiming Gao, and Tim LaClair
- SAE Technical Paper, 2020-01-1057, Apr. 2020

PROJECTS

An Innovative Vehicle-Powertrain Eco-Operation System for Efficient Plug-In Hybrid Electric Buses, UCR, Team Project

- Sponsored by Advanced Research Projects Agency-Energy (ARPA-E), United States Department of Energy
- Developed and realized a real-time automatic controller through Matlab/Simulink, and CANCaseXL
- Investigated the energy consumption of both default hybrid power split controller and the proposed innovative automatic hybrid power split controller
- Proposed an innovative data-driven modularized model for PHEB

Small-scale autonomous vehicle traffic challenge (AUTOTRAC), UCR, Team Project

- Sponsored by Joint Research Center (JRC) Exploratory Research Program of European Commission
- Led a team to design a fleet of 1/24 scale autonomous vehicles with communication ability to achieve fast and cooperative driving in both freeway and urban scenarios using Robot Operating System (ROS)
- Designed the system architecture and hardware to meet the competition requirements
- Built multiple algorithms to realize speed control, car following, lane tracking, parking, and emergency braking

Development of Eco-Friendly Ramp Control based on Connected and Automated Vehicle Technology, UCR, Team Project

- Sponsored by National Center for Sustainable Transportation (NCST), United States Department of Transportation
- Conducted a comprehensive literature review about the state-of-the-art of coordinated ramp control under mixed traffic conditions
- Developed a corridor-level cooperative ramp merging control system based on an optimal control strategy to provide a more energy efficient, safer, and higher mobility freeway ramp system

- Applied the proposed system to the traffic simulation environment (PTV VISSIM)

Development of Innovative On-Demand Shared Automated Mobility with Demand-side Cooperation, UCR, Team Project

- Collaborated with National Renewable Energy Laboratory (NREL)
- Proposed a demand-side cooperative shared automated mobility modeling and microscopic simulation framework
- Realized the simulation framework on the Simulation of Urban Mobility (SUMO) with its TraCI API

F1/10 Autonomous Racing Competition, OSU, Team Project

- Designed, built, and tested an autonomous 1/10th scale F1 race car with the capabilities of perception, planning, and control for autonomous navigation
- Designed and analyzed the path planning algorithm
- Designed the low-level control for the actuators

UAV Based L-band Radiometer for Soil Moisture Mapping, OSU, Team Project

- Built an airborne radiometer on fixed-wing and rotorcraft platforms, demonstrated in-flight data collection and mapping
- Calibrated and tested the microcontroller board in the team of data handling

Traffic Surveillance and Modeling, OSU, Team Project

- Extracted freeway vehicles driving information based on high-resolution cameras
- Applied traffic flow theory to analyze the extracted data to build a precise car following model and describe its properties (master's degree graduation exam project)

Action Units Classifier Design, OSU, Individual Project

- Designed classifiers with small verification error to identify facial action units of face images using Matlab
- Applied LDA, PCA algorithm and nearest-mean classifier method to train the classifier

Motorcade Following Simulation with Robot, OSU, Individual Project

- Designed a logic for three robots equipped with LIDAR to execute vehicle identification and following.
- Deployed V2V ability and V2I ability to improve the control logic

3D Structure Recovering, OSU, Individual Project

- Recovered 3D structure of a rigid object with its texture from pictures capturing different perspectives using Matlab
- Used Camera Calibration algorithm and Affine Structure from Motion algorithm