

## SUMMARY OF QUALIFICATIONS

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- More than seven years' academic research experience in control engineering with focus on automotive and aerospace dynamic systems.
- Detailed knowledge of autonomous driving subsystems, sensors and algorithms.
- Excellent programming, modelling and simulation skills in MATLAB, Simulink and CarSim.
- Strong analytical skills with ability to improve research procedures.

## RELEVANT EXPERIENCE

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### **Autonomous Driving Control Graduate Researcher**, University of Waterloo, May 2014 – Aug 2017

- Proposed an adaptive model predictive maneuver planning scheme for all road conditions.
- Developed a consensus estimation approach to identify the road condition cooperatively within the vehicular network.
- Evaluated the proposed estimation and control system using Simulink, CarSim and PreScan.
- Wrote several academic journal and conference papers.

### **Teaching Assistant**, University of Waterloo, May 2013 – April 2016

- Co-led and supervised undergraduate laboratory experiments.
- Communicated complex academic and technical materials using clear and concise language for graduate and undergraduate students.
- Managed course content through online learning management systems, Waterloo Learn.
- Awarded for Outstanding Teaching Assistant by the Mechanical and Mechatronics Engineering Department.

### **Electric Vehicles Control Graduate Researcher**, University of Waterloo, Sep 2012 – May 2014

- Developed a stochastic dynamic programming (SDP) control scheme, to calculate the optimal power distribution between four in-wheel motors.
- Integrated a skid avoidance algorithm to the power management strategy.
- Tested the proposed algorithm with a high-fidelity electric vehicle model in the Autonomie/Simulink environment.

### **Flight Mechanics Graduate Researcher**, Sharif University of Technology, Iran, Sep 2008 – Aug 2011

- Developed a two-phase fuzzy trajectory planner based on MATLAB's Fuzzy Toolbox.
- Employed a continuous ant-colony optimization algorithm to optimize the system's parameter.
- Evaluated the proposed trajectory planner by used a high-fidelity flying vehicle Simulink model.

## SELECTED PROJECTS

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### **Developed, tested and implemented a platoon merging algorithm for Grand Cooperative Driving Challenge, GCDC2016**, Sep 2015 – July 2016

- Collaborated with Chalmers University Team, a group of more than eight students and professors, to develop algorithms for paring, gap making and lane shifting stages of platoon merging
- Simulated highway autonomous driving of seven vehicles, driving in two platoons, equipped with V2V communication and positioning and mapping sensors.

### **Built and tested a fleet of autonomous scaled cars**, May 2015 – Nov 2016

- Collaborated with the Autonomous Vehicle Laboratory (WAVE) to build a fleet of four mini autonomous racing cars, MARC I-IV.
- Equipped these cars with sensors such as GPS, IMU, cameras, LiDAR and wireless link.
- Tested the platoon and collision avoidance algorithms in v-rep and ROS environment, using mechanical model of the cars and virtual LiDAR, GPS and IMU data.

**Developed localization, mapping, motion planning and tracking packages in C++/ROS environment for Turtlebot Robots, Sep 2014 – Jan 2016**

- Created C++/ROS packages in collaboration with three grad students to provide new functionalities for a Turtlebot robot which is equipped with Kinect, wheel encoders, rate gyros and a netbook with 1.6GHz dual core computation unit.
- Developed occupancy grid mapping, particle filter localization, rapidly random tree (RRT) path planning and PID path tacking packages for this robot to find its way and move inside an environment with obstacles.

**RELEVANT SKILLS**

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**Programming:** MATLAB, ROS, C++, LaTeX, GitHub

**Modeling and Simulation:** Simulink, CarSim, Autonomie, v-rep

**Operating Systems:** Ubuntu, Windows, macOS

**Hardware:** Arduino, Raspberry Pi and QUARC Quanser.

**EDUCATION**

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**PhD, Mechanical Engineering, Candidate,** University of Waterloo, May 2014 – Aug 2017

**Select courses:** Advanced Vehicle Dynamics, Autonomous Mobile Robotics, Adaptive Control

**M.Sc., Systems Design Engineering,** University of Waterloo, Sep 2012 – May 2014

**Select courses:** Optimal Control, Probabilistic Design, Machine Process Control, Multivariable Control

**M.Sc., Aerospace Engineering,** Sharif University of Technology, Tehran, Iran, Sep 2008 – Aug 2011

**Select courses:** Fuzzy Control, Modern Control, Guidance and Navigation, Project Management

**B.Sc., Aerospace Engineering,** Sharif University of Technology, Tehran, Iran, 2003 – 2008

**Selected Courses:** Aerodynamics, Dynamics, Flight Mechanics, Propulsion Systems

**SELECTED PUBLICATIONS**

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M. Jalalmaab, M. Pirani, B. Fidan, S. Jeon, “Cooperative Road Condition Estimation for an Adaptive Model Predictive Collision Avoidance Control Strategy”, Proc. IEEE Intelligent Vehicles Symposium (IV 2016), Gothenburg, Sweden, 2016.

M. Jalalmaab, B. Fidan, S. Jeon, P. Falcone, “Model Predictive Path Planning with Time-Varying Safety Constraints for Highway Autonomous Driving”, Proc. 17th International Conference on Advanced Robotics (ICAR 2015), Istanbul, Turkey, 2015.

M. Jalalmaab, N. Lashgarian, “A stochastic power management strategy for improving energy efficiency of in-wheel motor electric vehicles”, Proceedings of the IMechE, Part D: Journal of Automobile Engineering. (Under Review)

**OTHER ACTIVITIES**

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- **Committee Member, University of Waterloo Iranians Community:** Organized two yearly gatherings with more than two hundred participants.
- Enjoy soccer, tennis, swimming, robotics and programming