

# Xiao Li

2370 Lancashire DR APT 1B – Ann Arbor, MI – USA

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## Education

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### University of Michigan–Ann Arbor

Michigan, USA

*M.S. in Mechanical Engineering, Controls, GPA: 4.0/4.0*

*Sept. 2019 - May 2021*

- Honors: Jackson and Muriel Lum Fellowship

### Shanghai Jiao Tong University

Shanghai, China

*B.S. in Mechanical Engineering, GPA: 3.53/4.00, Ranking: 8/55*

*Sept. 2015 - Aug. 2019*

- Honors: Excellent Freshman Scholarship, Yu Liming Scholarship, SJTU Outstanding Graduates

### RWTH-Aachen

Aachen, Germany

*Exchange Student in Mechanical Engineering*

*Oct. 2017 - Mar. 2018*

## Research

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### Safe Control of Learned Neural Network Dynamic System with Uncertainties

Pennsylvania, USA

*Xiao Li, Tianhao Wei, Prof. Changliu Liu*

*May 2021 - Now*

- Emulate the ground-true dynamics using a fully-connected neural network (NN)
- Formulate an optimal tracking problem with system uncertainties using mixed integer linear programming

### A Set Theoretic Approach to RC Car Localization

Michigan, USA

*Xiao Li, Yutong Li, Prof. Ilya Kolmanovsky*

*Jan. 2021 - Now*

- Develop set membership based localization for CCTV system and infrastructure Lidar array
- Implement a convex polytope-based set estimation algorithm for localization and mapping using CORA in MATLAB
- Submit to ICRA 2022, preprint at [<https://arxiv.org/abs/2110.01749>]

### Dynamic Scene Graph and Visual Navigation

Michigan, USA

*Xiao Li, Yidong Du, Zhen Zeng, Prof. Chad Jenkins (aim for RA-L)*

*May 2020 - Now*

- Design a cognitive map representation to enable a dynamic memory of scene set-ups for domestic robots
- Implement visual navigation and localization modules using SeanNet in AI2THOR with Python

### SeanNet: Semantic Understanding Network for Localization Under Object Dynamics

Michigan, USA

*Xiao Li, Yidong Du, Zhen Zeng, Prof. Chad Jenkins*

*May 2020 - Jun 2021*

- Design a scene graph enhanced deep neuron network for localization under visual uncertainties using Pytorch
- Implement a visual navigation module with SeanNet for similarity based localization in AI2THOR with Python
- Submit to RA-L, preprint at [<https://arxiv.org/abs/2110.02276>]

## Projects

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### Test Platform for Autonomous Driving Functionalities

Michigan, USA

Advisor: Prof. Ilya Kolmanovsky, Prof. Bogdan Epureanu

Sept. 2020 - Dec. 2020

- Tune OptiTrack camera localization and write a communication network for multi-agent system using python
- Implement path planning algorithm and Stanley steering controller for autonomous vehicle parking

### FastSLAM and Data Association Error Analysis

Michigan, USA

Mobile Robotics (NAVARCH 568), Team Leader

Mar. 2020 - April. 2020

- Code FastSLAM with known and unknown data association in MATLAB
- Test the algorithm on self-generated map and implement FastSLAM on Victoria Park Dataset

### Optimal Switching Control Law in Hybrid System

Michigan, USA

Flight Trajectory Optimization (AEROSP 575), Team Member

Mar. 2020 - April. 2020

- Use Pontryagin Maximum Principle to derive optimal switching law for linear time invariant switched systems
- Reproduce experiment from a paper on autonomous system using shooting method in MATLAB

### Data-driven Analysis on SEIRS ODE

Michigan, USA

Machine Learning for Science (AEROSP 729), Team Leader

Mar. 2020 - April. 2020

- Parametrize SEIRS infectious disease model and investigate parameters' influence on epidemic trends
- Using neural network, dynamic modes decomposition and Koopman decomposition to predict system trajectory

### Car with Transformable Wheel Using Compliant Origami Mechanism

Shanghai, China

Design and Manufacturing II Course, Group Leader

May 2018 - Aug. 2018

- Designed and fabricated the transformable origami wheels using laminated material
- Used AutoCAD and UG to build 3D models for car components and emulate transformation animation

## Work Experiences & Activities

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### University of Michigan–Ann Arbor

Michigan, USA

Control of Aerospace Vehicles by Prof. Kolmanovsky, Graduate Student Instructor

Sept. 2020 - Dec. 2020

### Mech-Mind (Beijing) Robotics Technologies

Beijing, China

Product Development Department, Intern

Dec. 2018 - Mar. 2019

### Shanghai Jiao Tong University

Shanghai, China

Mechanical Behavior of Material, Teaching Assistant

Sept. 2018 - Nov. 2018

Chemistry Lab, Lab and Teaching Assistant

Mar. 2018 - May. 2018

## Skills

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**Programming:** C, Python, Pytorch,  $\text{\LaTeX}$ , Java and Arduino

**Software & Platform:** MATLAB, UG, Solidworks, Simulink, Abaqus