

# YANYU ZHANG

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## EDUCATION

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- University of California, Riverside** Sep. 2021 - Present  
Ph.D. in Electrical Engineering, Mentor: Wei Ren, GPA: 3.9/4.0  
**Research Interests:** State Estimation, Visual-Inertial Navigation, SLAM
- Boston University** Sep. 2019 - May 2021  
M.S. in Electrical and Computer Engineering, GPA: 3.7/4.0
- University of Detroit Mercy** Sep. 2018 - Jun. 2019  
B.S. in Robotics, GPA: 3.4/4.0
- Beijing University of Chemistry Technology** Sep. 2015 - Jun. 2018  
B.S. in Mechanical Design, Manufacture and Automation, GPA: 83%

## EXPERIENCE

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- Estimation and Sensor Fusion for Autonomous Vehicles Internship** Jan. 2023 – Apr. 2023  
*Mitsubishi Electric Research Laboratories (MERL), Mentor: Karl Berntorp*
- State estimation, Sensor Fusion, SLAM
- Researcher at Boston University** Jan. 2020 - May 2021  
*Boston University Robotics Lab, Mentor: John Baillieul*
- Motion planning, SLAM
- Securing Integrity of Micro-Service Builds on Cloud Internship** Sep. 2020 - Dec. 2020  
*Thomas J. Watson Research Center (IBM), Mentor: Shripad Nadgowda*
- CI/CD, Tekton pipelines design, MOC In-Toto.

## RESEARCH PROJECTS

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- Cooperative Lane Mapping using Fixed-Lag Smoothing**
- Propose a novel road-map model using Bezier curve and an adaptive keypoints combination algorithm.
  - Propose a loosely-coupled fixed-lag smoothing algorithm for kinematic and dynamic single track models.
  - Extend single-vehicle smoothing to a fully distributed road-map monitoring system.
- Point-Line Cooperative Visual-Inertial Odometry**
- Leverage common points-line features to improve accuracy, especially in low-textured environments.
  - Leverage neighbor's observations to bound long-term drifts of VIO.
  - IMU-to-camera intrinsic/extrinsic online calibrations, closest point line representation.
- Visual Navigation Using Sparse Optical Flow and Time-to-Transit**
- Theory of robust Eulerian and Lagrangian optical flow.
  - Analyse the geometric and perceived time-to-transit values under different feature densities.
- 5G Utility Pole Planner Using Google Street View and M-RCNN**
- Detect the utility poles based on M-RCNN.
  - Leverage an improved immune algorithm to map the poles on Google Static Street View.
  - Design a Django webpage to present the layout of poles' position within the selected areas on AWS.
- Intelligent Hotel ROS-based Service Robot**
- Design a service robot utilizing Hokuyo 2D Lidar and Kinect camera on a Pioneer 3 robot.
  - Estimate the best route utilizing the A\* algorithm and navigate across floors in an indoor environment.

## SKILLS

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- Languages: C++, Python, MATLAB, R
- Frameworks/Technologies: Git, OpenCV, ROS

## PUBLICATIONS

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- [1] **Y. Zhang**, H. Zhou, Y. Tsai, W. Ren, J. Chen, S. Krishnamurthy, and H. Qiu, "CooperSLAM: Infrastructure-less Cooperative SLAM for Interactive Multi-agent Augmented Reality", The 22<sup>nd</sup> ACM International Conference on Mobile Systems, Applications, and Services (MobiSys 2024). [In submission to MobiSys 2024]
- [2] **Y. Zhang**, H. Zhou, H. Liu, H. Qiu, and W. Ren, "Cooperative Lane Mapping using Fixed-Lag Smoothing", 2024 IEEE International Conference on Robotics and Automation (ICRA 2024). [In submission to ICRA 2024]
- [3] **Y. Zhang**, M. Greiff, W. Ren, and K. Berntorp, "Distributed Road-Map Monitoring Using Onboard Sensors", 2024 American Control Conference (ACC 2024). [In submission to ACC 2024]
- [4] J. Xu, P. Zhu, **Y. Zhang**, and W. Ren, "Cooperative 3-D Target State Estimation and Active Tracking", 2023 IEEE Conference on Decision and Control (CDC 2023).
- [5] **Y. Zhang**, P. Zhu, and W. Ren, "PL-CVIO: Point-Line Cooperative Visual-Inertial Odometry", 2023 IEEE Conference on Control Technology and Applications (CCTA 2023).
- [6] C. Boretti, P. Bich, **Y. Zhang** and J. Baillieul, "Visual Navigation Using Sparse Optical Flow and Time-to-Transit", 2022 IEEE International Conference on Robotics and Automation (ICRA 2022).
- [7] **Y. Zhang**, J Song, and S Li, "3D Object Detection and Tracking Using Monocular Camera in CARLA", 2021 IEEE International Conference on Electro Information Technology (EIT 2021).
- [8] **Y. Zhang** and O. Alshaykh, "5G Utility Pole Planner Using Google Street View and Mask R-CNN", 2020 IEEE International Conference on Electro Information Technology (EIT 2020).
- [9] **Y. Zhang**, X. Wang, X. Wu, W. Zhang, M. Jiang and M. Al-Khassaweneh, "Intelligent Hotel ROS-based Service Robot", 2019 IEEE International Conference on Electro Information Technology (EIT 2019).