

Lingjun Zhao

Github: <https://github.com/JunShao0104>

Email: lingjunz@umich.edu

Phone: (734)358-6915

EDUCATION

- **Tianjin University** Tianjin, China
B.E. in Mechanical Design, Manufacturing and Automation; GPA: 3.85/4.00 Sep 2018 - June 2022
Courses: Mechanical Design and Manufacturing, Mechanics, Control of Mechatronic Systems, Introduction to Robotics, etc
- **University of Michigan** Ann Arbor, USA
M.S. in Robotics; GPA: 4.00/4.00 Aug 2022 - April 2024
Courses: Math for Robotics, Robotics System Lab, Computer Vision, Mobile Robotics, Robot Learning for Planning and Control, etc.

SKILL

- **Programming Languages:** Python, C/C++, MATLAB
- **Frameworks and Tools:** PyTorch, MMDetection, OpenCV, Docker, GIT
- **Engineering Softwares:** SolidWorks, Creo, AutoCAD, ABAQUS, Adams

RESEARCH

- **LiDAR and Radar Fusion Transformer for 3D Object Detection** FCAV, University of Michigan
Directed Research, supervised by Prof. Katherine A. Skinner Jan 2023 - Present
 - **Data Preprocessing:** Voxelize and augment raw point clouds from LiDAR and Radar modalities.
 - **Sensor Fusion:** Encode LiDAR and Radar features with VoxelNet and PointPillars respectively and fuse them in the manner of middle fusion to form informative joint feature maps.
 - **Object Detection:** Decode LiDAR-Radar joint features via Transformer architecture to perform 3D object detection.
- **Micro-manipulation System Design on Ophthalmic Surgical Robot** Tianjin University
Individual Final Year Research, supervised by Prof. Fujun Wang Dec 2021 - June 2022
 - **Origami Mechanism Design:** Design a novel origami-based parallelogram RCM mechanism composed of flexure hinges and rigid body as the main structure of the invasive ophthalmic surgical robot.
 - **Kinematics Modelling and Simulation:** Complete the forward and inverse kinematics modelling and the robot motion simulation using the rigid-flexible coupling method.
 - **Statics Modelling and Simulation:** Establish the input stiffness model and the output flexibility model of the surgical robot, and evaluate its dynamics performance via finite element analysis.
 - **Parameter Optimization:** Optimize the robot's dimension parameters to improve its input and output stiffness.
- **A Tactile Sensor with Slippage Prediction by Unequal Height Dome Array** Tianjin University
Research Assistant, supervised by Prof. Le Song Jan 2021 - Aug 2021
 - **Tactile Sensor Design:** Engage in the design of a high-resolution optical reflective tactile and slip sensor integrated on a manipulator aimed at helping robots ensure safe contact and move objects safely in case of a possible collision.
 - **Finite Element Analysis:** Utilize finite element analysis method to construct the contact mechanics model and optimize the arrangement law of unequal height dome array.
 - **Slippage Prediction:** Improve the adaptability of the touch and slip sensor to the shape characteristics of the object, and prolong the pre-sliding window period and realized the sliding prediction function of smooth plate.

PROJECT

- **Loc-NeRF++: An Enhanced Robot Localization using Neural Radiance Fields** University of Michigan
Course Project, supervised by Prof. Maani Ghaffari Jan 2023 - Present
 - **Monte Carlo Localization with Stronger NeRF:** Scale up Monte Carlo localization to larger environments using bigger NeRF models, and leverage faster NeRF rendering to reduce computation time.
 - **Adaptive Particle Filter:** Improve existing particle filter used in Loc-NeRF by applying adaptive techniques to adjust the number of particles to perform more precise and real-time localization.
- **Depth-aware and Laplacian-steered Instance Style Transfer** University of Michigan
Course Project, supervised by Prof. Andrew Owens Sep 2022 - Dec 2022
 - **Semantic Segmentation:** Perform semantic segmentation using Fully Convolutional Network and SegNet, compare and evaluate them on PASCAL VOC 2012 Dataset.
 - **Depth-aware and Laplacian-steered loss:** Introduce depth-aware loss and Laplacian-steered loss into neural style transfer to keep the content image with more depth and detailed information.
 - **Instance Style Transfer:** Combine semantic segmentation with neural style transfer to form instance style transfer to stylize specific objects within one natural image using different artistic styles.
- **Design and Manufacturing of Soft Manipulator with Compound Structure** Tianjin University
Entrepreneurship Project, supervised by Prof. Fujun Wang May 2020 - May 2021
 - **Soft Gripper Design:** Design a soft robotic gripper with enhanced stiffness based on the layer interaction theory.
 - **Finite Element Analysis:** Perform finite element analysis on the designed soft robotic gripper to evaluate its statics and dynamics performance.
 - **Manufacturing and Grasping:** Manufacture a couple of soft robotic grippers utilizing 3D printing technology and teaming skill, and conduct grasping experiments on a variety of objects with different surface characteristics.

PUBLICATION

- **A Tactile Sensor with Slippage Prediction by Unequal Height Dome Array** IEEE SENSORS JOURNAL
Yong Yang, Meirong Zhao, Le Song, Yifan Jia, Lingjun Zhao, Dongji Piao, and Yelong Zheng Under Review

HONOR AND AWARD

- National Scholarship (**Top 0.2%**) - September, 2021
- Weichai Power Scholarship of Tianjin University (**Top 5%**) - November, 2020
- Merit Student of Tianjin University - 2019, 2020, 2021