

Ninghan Zhong

Personal Website: ivaniz.github.io

Google Scholar: <https://scholar.google.ca/citations?user=8zyHdjoAAAAJ&hl=en&oi=ao>

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EDUCATION

B.S. in Computer Science | **University of Illinois at Urbana-Champaign**

Aug 2018 - May 2022

Graduated with the Highest Honors

GPA: 3.97 / 4.0

MASc in Electrical and Computer Engineering | **University of Waterloo**

Aug 2023 - Aug 2025

GPA: 90.33 / 100

COURSEWORK

Machine Learning, Robot Perception & Manipulation, Reinforcement Learning, Algorithms & Data Structures

SELECTED PUBLICATIONS

- “Autonomous Navigation in Ice-Covered Waters with Learned Predictions on Ship-Ice Interactions”
 - **N. Zhong**, A. Potenza, and S. L. Smith
 - Under review for ICRA 2025 [[preprint](#)][[project page](#)]
- “Attentiveness Map Estimation for Haptic Teleoperation of Mobile Robot Obstacle Avoidance and Approach”
 - **N. Zhong** and K. Hauser
 - IEEE RA-L 2024 [[paper](#)]
- “Hierarchical Intention Tracking for Robust Human-Robot Collaboration in Industrial Assembly Tasks”
 - Z. Huang*, Y. J. Mun*, X. Li†, Y. Xie†, **N. Zhong**†, W. Liang, J. Geng, T. Chen, and K. Driggs-Campbell
 - ICRA 2023 [[paper](#)]
- “System Design, Evaluation and Applications of Domain Term Extraction from Engineering Videos”
 - J. Li, **N. Zhong**, R. Kooper, and L. Angrave
 - ASEE 2023 IL-IN Section [[paper](#)]

RESEARCH EXPERIENCE

Autonomous Systems Lab | generative AI, navigation among movable obstacles **Sept 2024 - Present**

Advisor: Prof. Stephen L. Smith

Department of Electrical and Computer Engineering, UWaterloo

- Researching motion planning for non-prehensile mobile robot navigation among movable obstacles
- Developing a learning pipeline with diffusion models for task-driven navigation among movable obstacles
- Exploring guided sampling approaches for generating high-reward obstacle interaction motions

Autonomous Systems Lab | deep learning, planning, autonomous navigations **Sept 2023 - Sept 2024**

- Proposed a deep learning framework that predicts the coarse dynamics of ice obstacles for ASV navigations
- Presented a novel approach that seamlessly integrates the learned model into a graph-search planner
- Designed an integrated predictive planner with a constant-factor theoretical guarantee for ASV navigations in ice-covered waters, reducing both collisions and travel distances
- Work currently under review for ICRA 2025 [[preprint](#)]

Intelligent Motion Lab | human modeling, perception, mobile robot teleoperation **May 2022 - Aug 2023**

Advisor: Prof. Kris Hauser

Department of Computer Science, UIUC

- Proposed a real-time human spatial attentiveness estimation model by combining visual saliency detection with computational working memory theories to optimize haptic feedback for mobile robot teleoperation
- Proposed an integrated perception pipeline that performs simultaneous environment mapping and human attentiveness estimation using a depth camera
- Experiments showed the proposed framework reduced teleoperation task completion time by 11%, human control effort by 19%, and obstacle collisions by 16%
- Work published in IEEE RA-L 2024 [[paper](#)]

Human-Centered Autonomy Lab | human-intention predictions, perception **Aug 2021 - May 2022**
 Advisor: *Prof. Katherine Driggs-Campbell* *Electrical and Computer Engineering Department, UIUC*

- Assisted with developing a robot control framework with hierarchical human-intention predictions for industrial assembly tasks
- Implemented an algorithm to localize target assembly parts in the robot workspace based on vision input from the robot wrist camera
- Work published in ICRA 2023 [[paper](#)]

ClassTranscribe Development | machine learning, HCI, Computer Vision **Dec 2020 - Dec 2021**
 Advisor: *Prof. Lawrence Angrave* *Department of Computer Science, UIUC*

- Proposed a novel scene change detection model for lecture videos using a Support Vector Machine, where features are extracted and processed by a combination of Optical Character Recognition and Multi-Task Cascaded Convolutional Neural Network. The model achieves a 97% accuracy in detecting scene changes
- Researched to improve speech-to-text recognition by supplying technical keywords
- Work published in ASEE 2022 [[paper](#)]

INTERNSHIP

Golden Ridge Robotics | **Computer Vision & Algo. Intern** - C++, ROS, OpenCV, PCL **May 2021 - Jul 2021**

- Developed an obstacle detection and localization model for low-speed sightseeing autonomous vehicles. The model combines UV disparity algorithms and point cloud projection to locate all detected obstacles and estimate their dimensions. The model achieves an accuracy of less than 30% relative error in obstacle dimension estimations and less than 12% relative error in distance estimations
- Developed a 3D autonomous navigation environment marking program that allows users to mark obstacles and driving areas with arbitrary shapes in point clouds for low-speed sightseeing autonomous vehicles. The marking program can mark an area as large as 25 km² with a decimeter-level accuracy

HONORS

- International Master's Award of Excellence \$12,500 CAD **University of Waterloo, Nov 2023**
- The Highest Honors at graduation **UIUC, Spring 2022**
- UIUC Dean's List (7 Semesters) **UIUC, Fall 2018 - Spring 2020, Spring 2021 - Spring 2022**
- James Scholars (2 Semesters) **UIUC, Fall 2021, Spring 2022**

PROFESSIONAL SKILLS

Software/Tools ROS, PyTorch, Mujoco, OpenAI Gym, Docker, Rviz, OpenCV
Programming Languages C++, C, Python, JavaScript, Java, C#

TEACHING EXPERIENCE

- Undergraduate Teaching/Lab Assistant **Principles of Safe Autonomy, UIUC, Spring 2022**
- Teaching Assistant **Discrete math II, University of Waterloo, Spring 2024**