

#### **Contacts:**

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#### **Education:**

- University of Michigan
- Aug 2022 Apr 2026
- BSE Computer Science
- Minor Mathematics
- GPA: 4.0/4.0

#### **Honors/Awards:**

- James B. Angell Scholar (2024)
- Branstrom Freshman Book Prize (2023)
- Engineering Honors Program (2023-Present)
- Dean's List (2022-2024)

#### **Programming Languages:**

- C++ (Experienced)
- Python (Experienced)

#### Frameworks & Tools:

- PyTorch
- ROS
- Docker
- Unix/Linux

## **Design & Fabrication:**

- SolidWorks
- Fusion 360
- 3D Printing
- Laser Cutting

#### Languages:

- English
- Chinese

# Huaidian Hou

# **Research Experience**

# University of Michigan Transportation Research Institute

 Research Assistant, Summer Undergraduate Research Experience
 Ann Arbor, MI, May 2024 – August 2024

 • Evaluated kinematics-based parametric car-following models with naturalistic congestion dataset.

 Conducted time-series clustering and statistical analysis to reflect human-model differences.

• Designed a scalable car-following simulation and visualization environment with PyTorch.

• Authored paper "Evaluating Parametric Car-Following Models in Naturalistic Congestions: Insights in Driver Behavior and Model Limitation", mentored by Dr. Brian Lin and Dr. Arpan Kusari, accepted by the Transportation Research Board Annual Meeting (2025).

# University of Michigan BIRDS Lab

- *Research Intern* Ann Arbor, MI, January 2024 Present
   Created template-based Moteus architecture for the PyCKBot package for the FastAnt project.
- Created efficient command generator and parser using string templates and regex in Python.
- Designed efficient message ID mechanism for robust CAN-bus collision and packet loss detection.

# University of Michigan Lab of Geometry

 Research Student
 Ann Arbor, MI, January 2024 – April 2024

 • Studied rigid body rotation modeling with Lagrangian mechanics with Dr. Alejandro Bravo-Doddoli through the University of Michigan Lab of Geometry program.

• Architected and led team development of the AniTop package, an open-source Euler, Lagrange, and Kovalevskaya tops (integrable tops) simulation and animation package in MATLAB and Python.

#### **Frankfurt Institute for Advanced Studies** *Research Intern*

Research Intern
 Conducted research on using Convolutional Neural Networks to predict crowd evacuation in a confined space. Co-designed simulation of real-time evacuation behavior with Cellular Automaton. Designed and evaluated TensorFlow CNN models in predicting simulation results, with fully and partially scoped inputs.
 Co-authored research paper "Measuring Dynamics in Evacuation Behaviour with Deep Learning", published in Entropy Journal.

Ann Arbor, MI, November 2022 - Present

Ann Arbor, MI, January 2024 - Present

# **Work Experience**

# University of Michigan Shapiro Design Lab

- Student Intern
  - Leading the Programmable-Dice project in collaboration with the U-M Language Resource Center.
    Co-lead process optimization for 3D printing appointments and equipment maintenance using a
  - combination of in-workshop notecards and an automated Notion site.

• Provide consultation for users with creative designs and manufacturing needs using 3D printing, laser cutting, and other toolkits available in Shapiro Design Lab.

# **Featured Projects**

## **Programmable Dice for Language Learning**

- Project Team Lead
  - Led brainstorming of key user experiences and practical use-cases to guide prototype design.
  - Architected a software-defined multi-screen system using Raspberry-Pi and ESP-32 to support simultaneous text, image, and gif display on 6 displays with compact hardware package.
  - Designed 3D-printed compact hardware mounting and packaging for first 3 prototype iterations.
  - Recruited diverse team of student developers, language-learning advisors, and survey-designers.

## Vehicle Detection, Tracking, and Crash Detection based on YOLO

 Student Team Leader (EECS 442)
 Ann Arbor, MI, March 2024 – April 2024

 • Conducted transfer-learning with YOLOv8-obb model onto Birds Eye View vehicular dataset for vehicle recognition.

- Developed linear-time polygon-intersection algorithm for efficient oriented-bounding-box (obb) IOU scoring in fine-tuning.
- Co-authored project report detailing algorithms, deep learning methods, and experimental results.

### Odometry Parameter Optimizer using VR Trackers and Linear Optimization Independent Developer Haverford, PA, May 2022 - June 2022

• Developed parameter-tuning utility (<u>OTune</u>) for wheel-odometry positioning with ROS and SteamVR in Linux, which pioneered team focus on data-driven toolchain for team-wide robot development.

• Derived optimization models for multiple wheel configuration parameters with least square method that fit tracking wheel velocity data ground truth velocities recorded by VR base stations. Produced CLI tool to visualize data fitting process.