

# Urara Kono

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Philadelphia, PA, 19104, the United States

## Education

### University of Pennsylvania

Master of Science - Electrical Engineering (GPA: 3.88 / 4.00)

July 2021 - Aug 2024 (Expected)

Philadelphia, PA

Interests: Robotics, Control Theory, Motion Planning, Optimization, State Estimation, Sensor Fusion, Machine Learning, AI

### The University of Tokyo

Bachelor of Engineering - Electrical and Electronic Engineering (GPA: 3.55 / 4.00)

Apr 2017 - Mar 2021

Tokyo, Japan

## Technical Skills

**Programming:** Python, MATLAB/Simulink, C/C++    **OS:** Linux    **Language:** English, Japanese (Native)

**Software:** ROS2, PyTorch, Git, PyChrono, Docker, Nerfstudio, OptiTrack, dSPACE, Eagle PCB, CAD

**Hardware:** Arduino, NVIDIA Jetson, IMU, GNSS, Wheel Encoder, LiDAR, PCB Milling Machine, Laser Cut

## Experience

### xLab, University of Pennsylvania — Robotics Research Engineer

Oct 2023 - Present

- Constructed an off-road **wheeled mobile robot** equipped with Nvidia Jetson, camera, GNSS, LiDAR, and wheel encoders, enhancing autonomous navigation capabilities. Achieved GNSS-based pure-pursuit controller and **3D SLAM** with LiDAR and IMU. Developing a sampling-based **MPC** controller. - **debugging, ROS2, ML** [\[picture\]](#)
- Simulated **MPC** for autonomous vehicles on multi-friction surfaces in a **vehicle simulator** PyChrono and **reduced the tracking error by 65%**. [\[code\]](#)

### Figueroa Robotics Lab, University of Pennsylvania — Robotics Research Engineer

May 2023 - Sep 2023

- Analyzed the reachability of a robotic arm for collision avoidance in Python, improving operational safety.

### ScalAR Lab, University of Pennsylvania — Robotics Research Engineer

July 2021 - Apr 2023

- Calculated reachable sets of **multi-agents** and developed the time-optimal paths in flow field using Python, validated with experiments on micro autonomous surface vehicles using OptiTrack and ROS. [\[report\]](#) [\[code\]](#)

### Hori-Fujimoto Laboratory, The University of Tokyo — Robotics Research Assistant

Feb 2020 - Mar 2021

- Developed a **localization** method for wheeled mobile robots on deformable terrain by estimating wheel slip from a wheel encoder and integrating the visual sensor, increasing the localization accuracy by 95% and publishing a research paper. - **Control Theory, MATLAB/Simulink, dSPACE and CAN**. [\[Research Paper\]](#)

## Projects

### Optimal Control and State Estimation on different robotic platforms

Sep 2022 - Dec 2023

- Developed controllers of a planar arm by **LQR, iLQR, MPC**, and **Reinforcement Learning**
- Designed **SLAM** of a humanoid robot with IMU and LIDAR by **Particle Filter**

### Learning Local Ocean Flows Using Neural ODEs Neural Network, PyTorch [\[report\]](#)

Dec 2022

- Learned the dynamics of the time varying/invariant double gyre flow using Neural ODEs. - **PyTorch, ML**

### Visual Inertial Odometry and Motion Planning of Quadcopter [\[report\]](#)

Jan 2022 - Apr 2022

- Estimated the pose of quadrotor with IMU and stereo camera pair using Error State **Kalman Filter**.
- Identified obstacle-free paths by implementing graph search algorithms such as **Dijkstra** and **A\***.
- Realized smooth trajectory planning by implementing geometric controller and min-jerk trajectory generator.

### A Rocket Launch for International Student Satellites (ARLIS) [\[poster\]](#) [\[article\]](#)

Apr 2019 - Oct 2019

- Designed and fabricated a **PCB** using Autodesk EAGLE for a casing deployed by a rocket at 4km height.

## Publication

U. Kono, H. Fujimoto and Y. Hori "Localization of Wheeled Robots from Slip Ratio Estimation with Simple Model," IEEE International Conference on Mechatronics 2021, Mar 2021. [\[Research Paper\]](#)