

Albus Dongchen Fang

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EDUCATION:

University of Michigan

August 2023 - April 2025

Master of Science - Robotics, Summa Cum Laude

GPA: 4.00/4.00

Course Highlights: Advanced Master's Research, Multiagent Systems, Self-driving Cars, Computer Vision

University of Michigan

August 2019 - April 2022

Bachelor of Science - Electrical Engineering, Summa Cum Laude

GPA: 3.93/4.00

RESEARCH EXPERIENCES:

DASC Lab Trajectory Optimization Research

April - September 2024

Professor Dimitra Panagou, University of Michigan at Ann Arbor

Ann Arbor, MI

Second Author of Journal Paper | PI: Prof. Dimitra Panagou

- Contributed significantly to a journal paper and validated theoretical models proposed in the paper by designing and executing a series of experiments
- Implemented a Machine Learning model to predict wind disturbances affecting drone performance within a reasonable error margin
- Employed an innovative variant of the Unscented Transformation algorithm, as outlined in the research paper, to enhance drone state prediction accuracy
- Engineered a ROS node that incorporates all aforementioned features to dynamically optimize PID controller gains, improving drone stability and performance by more than 10% in challenging wind conditions in real time
- Used JAX to accelerate computation for aforementioned algorithms including Machine Learning, the novel control algorithm, and the optimization algorithm with gradient descent on GPUs, enabling real-time processing and controller gain optimization

DASC Lab Advanced Master's Research

September 2023 - October 2024

Professor Dimitra Panagou, University of Michigan at Ann Arbor

Ann Arbor, MI

First Author of a Conference Paper and a poster presentation | PI: Prof. Dimitra Panagou

- Developed and integrated a multi-robot system utilizing Microsoft HoloLens 2, Jetson Xavier, and an overhead camera to stream aerial video of ground robots to a holographic interface, enabling Mixed Reality based user control of robot navigation
- Contributed to the open source and worked with various aspects of robotics, including Sensor Calibration, Human-Robot Interaction, Robot Operating Systems, and Control Theory
- Optimized the system to ensure accurate coordinate transmission with minimal latency, allowing users to view both historical and predicted trajectories of ground robots
- Designed and implemented safety features to ensure secure and reliable operation of the robotic system, mitigating potential risks and enhancing overall system safety
- Utilized AprilTag to calibrate the camera and enhance the accuracy of the coordinate transformation system, achieving a reduction in coordinate error to under 4% of the frame size

PUBLICATIONS

Albus Dongchen Fang, Phoebe Xu, Yanran Lin, Alia Gilbert, and Dimitra Panagou. "Mixed Reality Meets Robotic Systems: A Hololens2-Enabled Waypoint Navigation Interface." *In Proceedings of the VAM-HRI Workshop at ACM/IEEE International Conference on Human-Robot Interaction 2025 (HRI 2025)*. Accepted for publication.

Hardik Parwana, **Albus Dongchen Fang**, and Dimitra Panagou. "FORESEE: Prediction with Expansion-Compression Unscented Transform for Online Policy Optimization." *IEEE Transactions on Control Systems Technology*. Accepted for publication.

Albus Dongchen Fang and Dimitra Panagou. "Human Robot Interaction Outreach Project with Augmented Reality Headset." Poster presented at *Midwest Robotics Workshop*, Chicago, IL, USA, April 2024.

WORK EXPERIENCES:

Perceptron
Controls Research Engineer

January 2025 - Present
Plymouth, MI

- Deployed production-grade calibration and communication code on the live robotic system for field demos, ensuring reliable and accurate performance under real-world conditions
- Developed a Python program leveraging TCP and UDP protocols to acquire data from the vision system and robotic arm, coupling Sylvester Equation with Downhill Simplex Algorithm for flange-to-sensor calibration
- Enhanced calibration accuracy by 10x (1.7mm to 0.171mm), achieving sub-millimeter residual error
- Designed and integrated a gRPC interface enabling seamless backend communication between the calibration tool and the company’s web-based UI

Colossix Autonomous Construction (Startup)
Co-founder, Chief Technology Officer (CTO)

January 2025 - Present
Remote

- Led the design and development of a full-stack autonomy architecture for Colossix’s flagship autonomous road compactor, targeting next-generation construction automation.
- Developed and integrated a modular ROS2-based system encompassing dual-GNSS localization, real-time control, and Gazebo Fortress simulation, with the goal of deploying a field-ready prototype.
- Formulated the compactor’s kinematic and dynamic models using Equations of Motion; implemented and fine-tuned a cascaded PID control scheme to enable robust trajectory tracking.
- Integrated control and motion planning algorithms into a real-time autonomy stack; delivered live demos to investors to secure early-stage interest.

PROGRAMMING LANGUAGES/SKILLS:

Robot Operating System(Advanced), C++ (Intermediate), Python (Advanced), Simulink(Intermediate), JAX (Intermediate), MATLAB (Intermediate)

LEADERSHIP:

Michigan Backpacking Club (Activity Coordinator), Eta Kappa Nu (Projects Officer), Michigan Ballroom Dance Team, Les Voyageurs Outdoors Society