YEXIN ZHANG

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EDUCATION

University of Pennsylvania — **Philadelphia, PA, United States**
Master of Science in Engineering, Aritificial Intelligence and Robotics — *Sep 2023 - May 2025 (Expected)*

ShanghaiTech University — **Shanghai, China**
Bachelor of Engineering in Electrical and Information Engineering — *Sep 2019 - Jun 2023*

EXPERIENCE

AMNR Lab, ShanghaiTech University — **Shanghai, China**
Research Assistant — *Jun 2021 - Jun 2023*

- **Acoustic Tweezer System Construction**
  - Built a 2500-channel phase-modulated square wave generator with FPGAs using Verilog.
  - Developed a C++ Qt-based application, enhancing research efficiency by building user interface, creating functions for real-time image display and recording, task execution, and experiment data storage and visualization.
  - Filtered out noise from the oscilloscope by designing a high-pass filter, improving the SNR by a factor of 11.5.
  - Implemented an FPGA controller, facilitating bidirectional phase data transmission through CAN at 11 FPS.
  - Calibrated the micro camera with MATLAB, achieving average localization accuracy with only a 39 um error.
- **Noncontact Particle Vision-Servo Manipulation on Water Surface**
  - Designed an adaptive polarized circular acoustic field as the end-effector for trapping irregular objects.
  - Implemented and visualized end-effector simulations based on the angular spectrum method using Python.
  - Created a feature extraction algorithm for particle localization using OpenCV, achieving precision of sub-pixel.
  - Realized automated trapping of PS particles and droplets through the implementation of an acceleration model.
  - Implemented a closed-loop controller achieving precise position servo and orientation control with an error within 16 um and significantly reduced path planning error by 74.8%.
  - Successfully achieved high-precision assembly of surface-mounted LEDs onto flexible circuit boards.

P&G — **Remote**
Robotics Engineering Intern — *Apr - Jun 2023*

- Developed a Python-based palletizing robot algorithm with 97.5% accuracy in recognizing multiple boxes against complex backgrounds based on point clouds and grayscale images.
- Collaborated with a team to test the algorithm, improving overall object detection capabilities of the robot.
- Designed and implemented an efficient path-planning strategy model for a palletizing robot using MATLAB.

COMPETITION

2021 Xilinx China Women in Technology Hackathon — *Oct 2021*
Runner-up and Best Innovation Award in China Region, Winner in Shanghai Division

- Develop a Python-based guide car for visually impaired using Xilinx PYNQ-Z2 FPGA development board.
- Implemented Joystick control, orientation guidance, obstacle avoidance, and trajectory tracking functions.

PROJECTS

Remote Control Car — *Nov 2020*

- Developed an STM32-based car with functionalities including gamepad control and automatic navigation.
- Integrated temperature and humidity sensors for real-time environmental data on a user-friendly LCD screen.
- Attained high navigation accuracy by meticulously testing and optimizing a PID controller-based system.

DC-DC Boost Circuit Controller Design — *Oct - Dec 2021*

- Modeled a DC-DC boost converter in nonlinear system standard form and transferred it into a linearized system.
- Completed the controllability, stability, and observability analysis via simulation using MATLAB Simulink.
- Tested the robustness of the system by adding white noise to the system and evaluated its performance.

PUBLICATIONS

- **Noncontact Particle Manipulation on Water Surface with Ultrasonic Phased Array System and Microscopic Vision**
  First Author, Admitted by 2023 IEEE International Conference on Robotics and Automation (ICRA), London, United Kingdom, 2023, doi: 10.1109/ICRA48891.2023.10160724
- **Acoustic micro-assembly with Ultrasonic Phased Array and Microscopic Vision**
  First author, submitted under preparation to IEEE Transactions on Robotics.
- **Selective Non-contact Particle Manipulation with Ultrasonic Phased Transducer Array and Microscope**
  Second Author, submitted to IEEE Transactions on Automation Science and Engineering.

**Supervised by Prof. Song Liu | Advanced Micro-Nano Robot Lab | ShanghaiTech University*

TECHNICAL SKILLS

Programming Languages	C/C++, Python, MATLAB, Java, HTML/CSS, JavaScript, Verilog, VHDL
Other Skills	OpenCV, Qt, Open3D, Git, Linux, Vivado, Keil, Proteus, PSIM, STM32, PNYQ, Lab Instruments, Digital Signal/Image Processing, 3D Geometry
Ongoing Skills	ROS, machine learning, networked system