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 Manipulation System Construction**
  - Built a 2500-channel phase-modulated square wave generator with FPGAs using Verilog.
  - Developed a C++ program for oscilloscope data extraction, and real-time visualization of waveforms with a Butter-worth filter, resulting in an improvement of the Signal-to-Noise Ratio (SNR) by a factor of 11.5.
  - Teamed with 4 people to build an application with Qt, enhancing research efficiency by creating functions for real-time image display and recording, parameter settings, task execution, and experiment data storage.
  - Implemented an FPGA controller, enabling hologram updating at 11 FPS through CAN, facilitating bidirectional phase data transmission, and integrating real-time phase data visualization into the software interface.
  - Calibrated the micro camera with MATLAB, achieving average localization accuracy with only a 39 um error.
- **Noncontact Particle Manipulation on Water Surface with Ultrasonic Phased Array System and Microscopic Vision**
  - Designed a novel acoustic vortex beam generation method as the end-effector for the acoustic tweezer.
  - 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 positioning with an error within 16 um and significantly reduced path planning error by 74.8%.
- **Assembly of Micro-Object with Large Aspect Ratio**
  - Designed an adaptive polarized circular acoustic field as the end-effector for trapping irregular objects.
  - Implemented precise position servo and orientation control for large aspect ratio objects.
  - Successfully achieved high-precision assembly of surface-mounted LEDs onto flexible circuit boards.

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

- Developed an algorithm for a palletizing robot, with 97.5% accuracy in recognizing multiple boxes in complex backgrounds using point clouds and gray-scale images.
- Collaborated with a cross-functional team to integrate the algorithm into the robotics system, optimizing performance and enhancing the overall object detection capabilities.
- 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

- Led a team to develop a smart 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 to deliver real-time environmental insights, showcased on a user-friendly LCD screen for enhanced convenience.
- 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, Solidworks, Vivado, Keil, Proteus, PSIM, Multism, Digital Signal Processing