# Puen Xu

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## Education

**University of Pennsylvania (Penn)** — Philadelphia, PA
*M.S.E. in Robotics, GRASP Lab* — Aug 2024 - May 2026

**Worcester Polytechnic Institute (WPI)** — Worcester, MA
*B.S. in Robotics Engineering,* GPA: 3.95/4.0 (with High Distinction) — Aug 2020 - May 2024

## Work Experience

**Autonomous Loco-Manipulation Systems (ALMaS) Group, WPI** — Worcester, MA
*Mechanical & Embedded Software Lead* | Advisor: Prof. Mahdi Agheli — Aug 2023 – May 2024
- Designed, manufactured, and built light and robust 3-DoF Robotic Arm with 2-DoF Gripper using SolidWorks along with Rail System to attach arm onto Unitree Go1 Quadruped Robot.
- Developed ROS-Serial interface for communication between arm (Arduino) and Unitree Go1 (Raspberry Pi).
- Programmed and tuned PD Velocity Controller to achieve desired robotic arm motion with high precision.
- Collaborated with teams to integrate arm into in-house Trajectory Optimization Solver, enabling Loco-Manipulation of custom quadruped robot.

**Robots & Sensors for Human Well-Being (ROSE-HUB), WPI** — Worcester, MA
*Software Lead* | Advisor: Prof. Greg Lewin — Aug 2023 – Dec 2023
- Programmed State Machine ROS controller for custom robot in Python to patrol power transmission lines for deterrance of ravens, using combination of audio and visual stimuli when tampering with high-voltage wires.
- Trained custom YOLOv5 Detection Algorithm to recognize specific species of ravens, integrated into ROS controller for Collision Avoidance.
- Designed Mobile App using ReactJS to remotely monitor and control status and motion of robot via Amazon Web Services (AWS) database server.

## Project Experience

**Zero-Shot Hybrid Image Denoising** (Team of 2) — Jan 2024 – May 2024
- Proposed Zero-Shot Hybrid, tuning-free denoising method that adapts to complex noise patterns with stable inferencing by integrating ZS N2N training and BM3D algorithm.
- Demonstrated feasible performance on phantom, ex vivo, and in vivo data of Photoacoustic imaging compared with other learning-based and mathematical denoising methods.

**Unknown Maze SLAM and Navigation** (Team of 2) — Mar 2023 – May 2023
- Programmed Turtlebot 3 robot in ROS and Python to navigate through unknown maze and generate maze map using laser-based SLAM.
- Employed and tuned AMCL algorithm to allow robot to localize itself in maze upon self-generated map and navigate to desired destination by A* Search Algorithm.

**Vision-Based Robotic Pick and Place** (Team of 3) — Apr 2024 – May 2024
- Developed Autonomous Vision-based robotic Pick and Place system to sort balls of different colors with 3-DoF spherical robot manipulator using Computer Vision, Motion Planning techniques.

## Skills

**Robotics:** ROS, Linux, Mechanical Design, Embedded Systems, Robot Programming (C++, Python, MATLAB), Convex Optimization, Optimal Control, Reinforcement Learning

## Activities

**Member,** *National Society of Leadership and Success (NSLS)* — Aug 2024 – Present
**Member,** *Tau Beta Pi (Engineering Honor Society)* — Apr 2023 – Present