JOSHUA LIU
liushuya7@gmail.com | (410) 624-9504 | Baltimore, MD

Executive Summary

Robotics research engineer with over 10 years of experience in designing, developing, and integrating robotic systems across medical robotics, teleoperation, automation, and sensing. Expertise includes ROS2, real-time control, computer vision, and surgical robotics, with a proven track record of leading prototype development from concept through deployment.

Experience

Institute of Integrative & Innovative Research, UARK
Robotics Research Engineer
Fayetteville, AR (remote)
Oct 2024 - Present

- Developed a robot teleoperation system for ultrasound scanning with real-time remote control and haptic feedback.
- Designed an actuation unit for a continuum dexterous manipulator with Fiber Bragg Gratings for high-precision shape estimation.
- Developed a ROS2 software framework for robot-assisted orthopedic surgery, including navigation, sensing, and control.
- Built a stereo-vision ball-catching robot demonstration system.

Hopkins Extreme Materials Institute, JHU
Research Engineer
Baltimore, MD
Aug 2022 - Dec 2023

- Automated conveyor and UR robots using Siemens PLC.
- Automated laser shock and engraving subsystems and supported X-ray subsystem integration and simulation.

Laboratory for Computational Sensing and Robotics, JHU
Research Engineer
Baltimore, MD
Aug 2022 - Oct 2024

- Integrated a continuum dexterous manipulator with a Universal Robot platform.
- Migrated existing system components to a ROS2 framework.

Laboratory of Biomechanical and Image Guided Surgical Systems, JHU
Postdoctoral Research Fellow
Baltimore, MD
Oct 2021 - Aug 2022

- Developed robotic applications for spinal surgery.
- Designed a capacitive shape sensor for a continuum dexterous manipulator.
- Assisted with 3D scanning applications for total-body photography in skin lesion detection.

Laboratory of Biomechanical and Image Guided Surgical Systems, JHU
Graduate Research Assistant
Baltimore, MD
Jan 2016 - Aug 2021

- Designed reattachable fiducial markers for intraoperative patient-to-CT registration using 3D scanners.
- Developed a cutting toolpath algorithm for cranial implant modification and implemented robotic 3D scanning on a KUKA iiwa robot.
- Designed a 5-axis laser cutting system, including mechanical design, GUI development, ROS2 nodes, implant registration, and toolpath optimization.
- Developed a miniature optical tracking system using a RealSense camera for projection mapping and patient-to-CT registration.

BMW Group
Robotics Summer Intern - Internship
Shanghai
May 2014 - Aug 2014

- Contributed to ROS framework development for a self-driving car research platform.
- Developed an RViz visualization plugin for laser radar sensors.

Education

Johns Hopkins University
Baltimore, MD
Ph.D. - Mechanical Engineering
Jan 2016 - Aug 2021
Dissertation: *Robotic Implant Modification for Neuroplastic Surgery*
Advisor: Dr. Mehran Armand

Johns Hopkins University
Baltimore, MD
M.S.E. - Mechanical Engineering
Aug 2013 - May 2015

Changsha University of Science and Technology
Changsha, Hunan, China
B.S. - Mechanical Engineering
Sep 2009 - Jun 2013

Skills

Mechanical Design; Robotic; Sensors; Siemens PLC; Solidworks; Computer Vision; Human Machine Interface; Robot Operating System; Robotics; Laboratory; Robot; HMI; Toolpath; Sensor; X-RAY; Autodesk; Algorithm; Arduino; C/C++; GUI; Python; System Integration; Real-Time; Laser; CNC Machining; Machine Shop; 3D Printing; Ultrasound; PCB; Scanning; CAD/CAM; Visualization

Languages

English
Chinese