Xiaorui Gu

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Education

Northwestern University   Evanston, IL
M.S. in Electrical Engineering   Sep 2025 - Jun 2027 (Expected)

University of Illinois   Urbana, IL
B.S. in Mechanical Engineering   Aug 2021 – May 2025
Minor in Electrical Engineering
Control Systems Track

Research

Center for Robotics and Biosystems   Aug 2025 – Present
Thesis Advisor: Prof. Ed Colgate, Northwestern University

- Developing tactile sensing skin for enhancing robotic dexterity under contact-rich tasks.

Mobility and Fall Prevention Research Laboratory   Jun 2024 – Mar 2025
Advisor: Prof. Manuel E. Hernandez, University of Illinois

- Developed a piezoresistive pressure sensor array based on Velostat, achieving high sensitivity and portability for gait analysis and rehabilitation exercise.

Bahl Research Group   Aug 2023 – Jan 2025
Advisor: Prof. Gaurav Bahl, University of Illinois

- Designed and constructed experimental setups for a fully levitated 6-DOF system, potentially for use in low-frequency signal generation and IMUs.
- Provided manufacturing support across semesters, including CAD, 3D printing, laser cutting, water jet cutting, CNC machining, and PCBA.

Garg Group   May 2023 – Mar 2025
Advisor: Prof. Nishant Garg, University of Illinois

- Prototyped a temperature-humidity monitoring sensor array with Arduino and ESP8266, integrating wireless data collection with Firebase.
- Investigated 3D vision reconstruction for measuring concrete mix flow motion using OpenCV and Open3D.

Publication

Gu, X., Gupta, P., Liu, J., Zhou, H., Cisto, B., Khan, M. A., Mason, S., Motl, R., Sebastiao, E., & Hernandez, M. E. *Intelligent Square Stepping Exercise System for Cognitive-Motor Rehabilitation in Older Adults with Multiple Sclerosis. Proceedings of the 2025 Design of Medical Devices Conference*, Minneapolis, MN.

Selected Projects

Autonomous Driving with Static & Dynamic Obstacle Avoidance   Jan 2025 – May 2025
Team: SafeTaxi, ECE484: Principles of Safe Autonomy, UIUC

- Worked on control algorithms for lane following and various obstacle avoidance scenarios based on vision/lidar inputs on a NVIDIA Jetson NX.

Object Recognition on Mobile DSP   Aug 2024 – Dec 2024
Team: UIUC Campus Tour Application, ECE420: Embedded DSP Systems, UIUC

- Built an Android mobile app for landmark classification using SIFT feature extraction, K-means clustering, and SVM classification.

Skills

Programming - Python, C/C++, Racket, MATLAB, Linux, Anaconda, Git
CAD & Simulation - KiCAD, Autodesk Fusion 360, SolidWorks
Library & Framework - OpenCV, PyTorch, ROS2, Gazebo