XINLEI ZHANG | CURRICULUM VITAE

+1 984-800-4198 xzhan245@ncsu.edu github.io

RESEARCH INTERESTS & GOAL

My research interests lie in the **theories** and **applications** in **robotics**, including **state estimation** & **robust control**, **nonlinear control**, and **data-driven methods**. My goal is to advance robotics research by integrating control theory and artificial intelligence methods.
Understanding the math underlying robotic systems for their controller (brain) design

EDUCATION

North Carolina State University (NCSU) 08/2024 - Present
Ph.D. Student in Mechanical Engineering Raleigh, US

South China University of Technology (SCUT) 09/2020 - 07/2024
B.Eng. in Intelligent Manufacturing, cumulative GPA: 3.78/4.00 Guangzhou, China
Thesis: Design of Magnetic Source Configuration and Pose Estimation Algorithm in Electromagnetic Tracking System

PUBLICATION (* INDICATES CO-FIRST AUTHORS)

On Ambiguity in 6-DoF Magnetic Pose Estimation (first two-page preview) In Preparation
Xinlei Zhang*, Shuda Dong*, Yifeng Zeng and Heng Wang

PATENT

Electromagnetic positioning system, electromagnetic positioning method and device Pending
Heng Wang, Xinlei Zhang, Shuda Dong, Dekang Liu, Yifeng Zeng, Suqi Liu
Applied to CN Patent, No.CN118444243A

A Virtual Ultrasonography Simulator for Skill Training Using Magnetic-Inertial Probe Tracking Pending
Heng Wang, Shuangyi Wang, Suqi Liu, Shuda Dong, Xinlei Zhang
Applied to CN Patent, No.CN116312122A

RESEARCH EXPERIENCE

Intelligent Controls Lab, NCSU 01/2025-Present
Ph.D. Studnet Raleigh, USA
Advisor: Dr. Donggun Lee
- Research on solving zero-sum game using model predictive path integral control method

Magnetic Medical Robotics Lab, SCUT 09/2021-07/2024
Undergraduate Research Assistant Guangzhou, China
Advisor: Dr. Heng Wang
- Research on amgbiuity in magnetic & inertial 6-DoF pose estimation systems in robotic applications

RELATED COURSE PROJECTS

Point-to-point Kinematic Control of the 3-Joint Robotic Arm in the Presence of Obstacles Fall 2024
Direct optimization, Model Predictive Control, Kinematic Control of a 3-joint Robotic Arm

Building, Fine-tuning, and Locally Deploying Large Language Models (LLMs) with Customized Dataset Fall 2024
GPT-2 Building and Fine-tuning, llama 3.1 (8b) Local Deploying and Fine-tuning

Tendon-Driven and Flex Sensor Based Gesture Sensing Hand Exoskeleton Spring 2023
PID Motor Control, Exoskeleton, Tendon-driven Mechanism, Bending Sensor, Gesture Tracking.

Wireless-Powered Animation System Displayed by Rotating LEDs Fall 2022
Wireless-charging Circuit Design, Infrared Sensor, Sounding Module, Animation by Rotating LED Stripe.

Omni-Motion, Bluetooth-control and Self-Reloading Automatic Catapult Spring 2022
Omni-motion UGV Design, Bluetooth & Android App, Lever-Spring-Motor Shooting Mechanism.

Machine Learning & IMU Based Classifier on Ping-Pong Players' Motion Fall 2021
IMU, Classifier: Neural Network & Decision Tree, Fault Detection: One-class SVM & Local Outlier Factor.

Selected Awards & Honors

University Graduate Fellowship 2024-2025
University-wide fellowship, granted only to outstanding entering doctoral students in NCSU

Best Senior Undergraduate Thesis Award 06/2024
University-wide best senior thesis award in SCUT

Mathematical Contest in Modeling 05/2023
Honorable Mention (Second-Class Award), Top 30%

Alibaba Cloud Programming Contest in SCUT 03/2023
Third-Class Award, Top 15%

Undergraduate Internship Scholarship, funded by China Scholarship Council & University of Alberta 08/2022
Top Chinese government-funded scholarship for research internship in University of Alberta

National Contest on Micro Sensing and Intelligent Technology 10/2021
National First Prize & Excellent Defense, Top 4%

Teaching Experience

MAE 405 - Controls Lab, NCSU 2024 Fall & 2025 Spring
Teaching Assistant
PLC programming, Circuit Basics - building PID controller from scratch

Technical Skills

Control & Estimation Algorithm: PID, model predictive control (MPC), extended Kalman filter (EKF)
Programming: Proficient in **MATLAB** & Simulink, Python, C/C++, HTML
Optimization: MATLAB Optimization Toolbox, CasADi
Operating System: ROS2, ROS, Linux
Hardware: Solidworks modeling, embedded system development (Arduino, STM32, Raspberry Pi)