

Zehua Wu

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EDUCATION BACKGROUND

University of Pennsylvania (UPenn), Philadelphia, USA

Sept. 2024 - May 2026

School of Engineering and Applied Science

Expected M.S. in Electrical Engineering in May 2026

GPA: 3.51/4.0

Southeast University Chengxian College, Nanjing, China

Sept.2020 - Jun. 2024

School of Electronic and Computer Engineering

B.Eng. in Automation

GPA: 3.59/4.0 | Ranking: 4th/58 (Top 6%)

RESEARCH INTERESTS

- **Embodied Intelligence, Robotics, Computer Vision, Deep Learning**

PAPERS & PATENT

- **Paper:** Zheng Ying, **Zehua Wu**, Guifang Qiao, Lizhen Zhang, Jiajia Yu. "Robot geometric parameter identification method based on multi-objective difference evolution algorithm." China Measurement & Testing. **(Accepted, In Press)**
- **Paper:** Zheng Ying, **Zehua Wu**, Guifang Qiao, Yichao Wu, Xinyun Zhu. "Compensation of industrial robot positioning accuracy based on multi-layer perceptron." Instrument Technique and Sensor. **(Accepted, In Press)**
- **Paper:** Zheng Ying, **Zehua Wu**, Guifang Qiao. "Research on Robot Accuracy Compensation Method Based on Particle Swarm Optimization Neural Network." Journal of Mechanical Science and Technology. **(Under Review)**
- **Patent:** Junxin Sun, Jiajia Yu, Yirun Song, **Zehua Wu**, Siyu Zhou, A Multi-model Detection Method and System for Intelligent Transportation[P], China Patent: CN116311100A, filed Mar.23, 2023, published Jun.23, 2023

PROFESSIONAL EXPERIENCE

Design and Development of TissueLab—Interdisciplinary Program Between Medical Imaging & AI

Research Software Developer | Advisor: Asst. Prof. Zhi Huang, UPenn

Dec. 2025 - Now

- Optimized whole slide imaging tile loading performance by designing and implementing algorithms to accelerate reading and loading of large-scale image tiles, shedding light on the I/O latency and CPU bottleneck
- Reconstructed the core modules, and programmed unit tests and performance benchmarks to validate optimization effects and ensure code quality
- Dedicating myself to designing and developing the TissueLab software

Augmented Contact-Aware Trowel-Brick Manipulation via Imitation-Guided Policy

Advisor: Asst. Prof. Fei Liu, the University of Tennessee, Knoxville

Jun. - Aug. 2025

- Extracted spatial-temporal consistent 3D point clouds of trowel and bricks from human demonstration videos using CoTracker and Depth-Anything-2
- Performed trajectory extraction of workers' spreading mortar motion, and performed 3D scene reconstruction of major objects with PyVista
- Explored motion trajectory generation for spreading mortar actions using Linear Parameter-Varying Dynamical System and Probabilistic Movement Primitives
- Investigated geometry constraints within the reconstructed scene using basic constraint models to design motion policies

Precision Improvement System for Industrial Robot, Parameter Identification Algorithm

Advisor: Prof. Guifang Qiao, Nanjing Institute of Technology

Nov. 2023 - Jun. 2024

Won a **third prize** in the 2024 Jiangsu Instrumental and Control Society Undergraduate Completion (Thesis) Incentive Plan

- Built the forward kinematics model for Stabuli TX60 robot arm via MD-H parameterizations
- Conducted positioning experiments using the Leica AT960 laser tracker, and collected

- high-precision pose data for calibration
- Applied intelligent optimization algorithms, including Particle Swarm Optimization, Differential Evolution, and Neural Networks, for kinematic parameter identification & error compensation

Computer Vision and Self-Driving Car Program

- RA | Supervisor: Dr. Ian Deng, University of California, San Diego Mar. - Sept. 2023
- Implemented various image operations and transformations, including rotation, mosaic, sampling, quantization, and shifting, and applied digital image processing techniques
 - Conducted image classification using TensorFlow on the CIFAR-100 dataset, evaluated performance metrics using confusion matrices and implemented KNN with Scikit-learn
 - Trained and fine-tuned neural networks such as MLP and CNN for image classification tasks
 - Designed and implemented semantic segmentation models using FCN8s with VGG16 as the backbone in TensorFlow, applying the model to a 12-class image segmentation dataset
 - Developed DeepLab v3 model with ResNet-50 and Xception-65 as backbones, achieving 80.5% accuracy on the test dataset for a 12-class image segmentation task

Unmanned Robotic Control

- RA | Advisor: Xuqiang Guo, Chinese Academy of Sciences Jun. - Sept. 2022
- Designed functional modules, and assembled a two-wheeled differential drive robot
 - Completed the infrared sensor-based tracing in C language and Arduino IDE
 - Implemented the PID control algorithms to control the trolley's speed during operation

SELECTED PROJECTS

- Course Project for ESE6500 - Language-guided Indoor Robot Navigation** Mar. - May 2025
- Designed a framework integrating vision-language semantic mapping (VLMMap) with LLM-based task planning to enable natural language instruction following for indoor robots
 - Implemented a zero-shot object localization from RGB-D and LiDAR data, and generated collision-free trajectories via A* path planning
 - Validated the system on an F1TENTH-scale autonomous vehicle, achieving structured multi-object pick-and-place tasks.

- Course Project for ESE5460 - Semantic Segmentation Framework** Nov. - Dec. 2024
- Developed a modular semantic segmentation framework supporting models like State-Space Models, SegFormers, and DeepLap v3+, capable of training, logging, visualization & inference
 - Evaluated model performance on the BDD100k dataset for autonomous driving applications

- MiniSpotify - An Android Music Player** Nov. - Dec. 2024
- Designed a KotlinSpotify favorite app via Android Jetpack Library & Hilt Dependency Injection
 - Implemented the BottomBar and App Navigation via the Jetpack Navigation component
 - Created a mock RESTFUL Api JSON Server, and used Retrofit to handle requests
 - Build the feed/album/favorite UI in Jetpack Compose following MVVM architecture
 - Enabled the local cache ability for the favorite feature by using Room Database
 - Integrated the Google Exoplayer to handle the global music playback

- DeliciousChoices - A Spring Boot Based Online Food Ordering Web Application** Aug. - Oct. 2024
- Developed CRUD REST APIs using Spring Controllers; Leveraged Spring Data JDBC and repositories to interface with a PostgreSQL database hosted on AWS RDS
 - Constructed the frontend using React.js and Ant Design, providing users with the ability to seamlessly add items to their food cart and place orders
 - Containerized the build and pushed the image to AWS ECR, successfully deployed it to AWS App Runner for streamlined scalability and accessibility

SKILLS

- ❖ **Programming Languages:** Java, Python, C++, JavaScript
- ❖ **Tools:** IntelliJ IDEA, Docker, AWS, Visual Studio Code, PyCharm, Anaconda, Colab, MATLAB, arm Keil5 MDK, Overleaf, Postman, Arduino
- ❖ **Frameworks:** PyTorch, TensorFlow, Spring Boot, React.js
- ❖ **Languages:** Chinese (Native), English (Professional Proficiency)