

Embedded Systems & Validation Engineer

Target roles: System Validation · Embedded Test · Embedded Systems

Bachelor's in Electronic Information Science and Technology, with hands-on experience in medical-electronics R&D testing and cross-disciplinary prototype development. On most projects I own the core technical work end to end: hardware, mechanical structure, software, vision and system integration. **I measure first, then conclude.**

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Experience

Zhiyong Youth STEM Innovation 智勇青少年科创 STEM Project Mentor (Prototype Development)2025.05 – 2026.05

- Turned project ideas and requirements into engineering plans; on most projects, independently handled component selection, hardware and mechanical build, software and vision development, system integration and delivery.
- Made trade-offs within budget, fabrication and schedule limits; resolved communication, control and recognition issues by reproducing faults, comparing conditions and tuning parameters and structures.
- Worked directly with stakeholders on functional goals, technical feasibility and scope; ran testing, demos and iterations. Representative projects: vision-guided sorting arm, human-following tracked robot.

Qisi Lab 奇思实验室 Project Incubation Mentor (Prototype Development & Delivery)2024.05 – 2024.09

- Took innovation projects from concept to working prototype: requirement breakdown, solution design, and MCU prototype build and debugging.
- Worked throughout on embedded and control hardware projects; delivered functional demos and handover documentation.

Reach Surgical (Tianjin) Co., Ltd. 天津瑞奇外科器械股份有限公司 Electronics R&D Intern2023.12 – 2024.05

- Tested ultrasonic-scalpel and electrosurgical energy platforms with oscilloscopes, multimeters, DC power supplies, electronic loads and signal generators; built test setups, soldered, captured waveforms and logged data.
- Wrote Python test-support scripts; contributed to a Qt device-software upgrade tool and to STM32 debugging.
- Investigated abnormal output spikes through repeated tests, adjusted test conditions and waveform comparison, helping narrow down the problem range.

Education & Awards

Electronic Information Science and Technology Bachelor's · 2020.09 – 2024.06 · CET-4

2023 Jilin Provincial Undergraduate Electronic Design Contest · 2nd Prize Single-phase inverter parallel operation system · Team lead

2023 China Collegiate Computer Design Contest, Jilin Provincial Round · 1st Prize Smart-agriculture pest analysis & early warning · Team member

Selected projects

Ultrasonic / Electrosurgical Energy Platform Testing

Electronics R&D Intern · Medical electronics · 2023.12 — 2024.05

Tested ultrasonic-scalpel and electrosurgical energy platforms on a medical-electronics R&D team: built the test environment, captured waveforms and logged data, and supported software-tool and firmware debugging.

Instruments	Oscilloscope · electronic load · signal generator · DC supply · multimeter
Software	Python test-support scripts · Qt device-software upgrade tool · STM32 debugging
Method	Repeated tests · adjusted conditions · waveform comparison, to narrow down abnormal spikes

Four-Color Block Sorting Robot Arm

Core technical work done independently · real-hardware integration · 2026

Turns the 2D image from a USB camera into arm motion: recognizing, locating, picking and binning red, yellow, green and blue blocks.

Recognition	HSV color segmentation, contour analysis, multi-frame stability check
Mapping	16-point workspace calibration with piecewise affine mapping
Execution	Inverse-kinematics pre-check, joint-range validation, angle read-back and single-joint resend

Pose-Recognition Human-Following Tracked Robot

STEM prototype · vision & motion control

Detects a person with YOLO11 Pose, turns the horizontal offset and bounding-box area into steer / forward / reverse commands, and sends them over serial to the tracked chassis.

Target lost	Stop
Link lost	Stop after a 500 ms timeout
Commands	Horizontal offset → steering; box area → forward / reverse

Single-Phase Inverter Parallel System

Team lead · PCB & hardware integration · 2023

Mainly responsible for PCB design, hardware build and system integration; took part in inter-unit communication and synchronization, output stability and protection-logic verification.

System	Parallel operation and synchronization logic
Protection	Over-current / over-voltage / overload
Result	2nd Prize, Jilin Provincial Undergraduate Electronic Design Contest

Core skills

Embedded & control	STM32 · ESP32 · Arduino C / C++, UART / SPI / I ² C; sensor acquisition, actuator control and hardware–software integration. CAN (learning).
Software & vision	Python · OpenCV · Qt Test-support scripts and device tooling; YOLO, MaixCam and ROS2 project integration.
Test & debug	Waveform capture · fault reproduction · condition comparison Oscilloscope, multimeter, DC supply, electronic load, signal generator; test data logging.
Mechanical & build	SolidWorks · 3D printing · soldering Mechanical design and build, component selection, prototyping and system integration.

Test points

TP1 Abnormal output spike Abnormal spikes during energy-platform testing → Repeated tests, adjusted conditions, compared waveforms → Helped the R&D team narrow down the problem range → Reach · medical-electronics R&D	TP2 Servo missed a command A robot-arm joint occasionally stopped short of its target → Read back every joint angle after sending and compared with the target → A single servo occasionally dropped a command → Angle read-back + single-joint resend
TP3 Motor won't turn Motor didn't turn after power-up → Multimeter read about 8 V against 12.6 V nominal → Supply voltage too low to drive the motor → Switched to an 18650 battery pack	TP4 Stepper wiring A NEMA 17 stepper on a TB6600 driver ran erratically → Measured coil resistance to identify the two phase windings → Motor phase wires were connected wrong → Rewired to the measured windings

Now learning

CAN bus LEARNING

Frame structure, arbitration, bit timing and error handling.
Next: a two-node bus with an MCU and CAN transceivers, probing the CANH / CANL differential signal on a scope.

Python test automation PLANNED

Building on my existing test-support scripts: drive bench instruments from Python over serial / SCPI, capture and log data automatically, and script the manual test flow.