

# Eric Rosenfeld

Robotic Software Engineer

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Portfolio: [e Rosenfeld.com](https://e Rosenfeld.com)

<https://github.com/e Rosenfeld>

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## PROFESSIONAL EXPERIENCE

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Robotics software engineer specializing in embedded systems and real time motion control for multi axis robots. Strong C++ and Python with hands on experience bringing up motors, encoders, sensors, and industrial hardware on Embedded Linux. Built production motor control and communication stacks using CAN and EtherCAT including PID tuning, trajectory execution, fault handling, and reliability improvements. Known for debugging undocumented systems across firmware behavior, bus timing, multithreading, and end to end integration

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### Robotic Software Engineer | Productive Robotics | Carpinteria, CA

July 2025 - Present

- Developed C++ motor control and device integration software for production robots including CAN based command streaming, feedback parsing, and real time state machines for multi axis motion
- Integrated CAN motor control into an EtherCAT ecosystem through adapter layers and common motion APIs enabling unified control paths across multiple actuator types
- Tuned PID, motion behavior and debugged instability through iterative testing, parameter management, and timing analysis across control loops and bus traffic
- Built and debugged hardware communication stacks across CAN, EtherCAT, RS485, Modbus TCP, and EtherNet IP integrating motors, PLCs, and sensors into a deterministic robotics system.
- Resolved reliability issues involving multithreading and timing including race conditions and state transition faults improving stability for extended autonomous operation.
- Prototyped perception and embedded inference pipelines using OpenCV and TensorFlow Lite including deployment on ESP32 class devices for detection and guidance experiments
- Built operator tooling including web dashboards and Android tablet UIs for configuration, diagnostics, and live monitoring of robotic workflows.
- Delivered confidential customer programs under NDA translating prototypes into production features under tight timelines and frequent requirement changes

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### Automation Engineer | Global Contract Manufacturing | Union City, CA

March 2019-August 2023

- Built Python automation middleware integrating production equipment, sensors, and ERP systems enabling reliable factory scale control and monitoring
- Developed real time data pipelines and dashboards using SQL and Power BI to drive operational decisions and throughput improvements.
- Automated CNC monitoring and inspection workflows increasing output 300 percent through system integration and closed loop defect detection
- Led end to end automation projects from fixture concept through software integration, deployment, and on-site debugging

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### Power Electronics Engineer Intern | Tesla | Palo Alto, CA

Jan 2019 – May 2019

- Built automated validation and communication test systems for embedded hardware using TCP, UDP, HTTP, and SWC protocols
- Partnered with firmware and electrical teams to accelerate test cycles and improve reliability of power electronics validation

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## AREA OF EXPERTISE

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### Embedded Systems & Robotics

C++  
Python  
Embedded Linux  
Real time control systems  
Motor control and PID tuning  
Trajectory generation  
Joint level control concepts  
Encoders and sensor integration  
Hardware bring up and debugging  
Multithreading and concurrency  
Fault handling and safe states

### Communication & Industrial Protocols

CAN  
EtherCAT  
RS 485  
Modbus TCP  
EtherNet IP  
SocketCAN  
PLC integration  
ROS and ROS2  
State machines  
Timing and synchronization

### Systems, AI & Tooling

OpenCV  
TensorFlow Lite  
Embedded vision pipelines  
FastAPI  
REST APIs  
PostgreSQL and MySQL  
Next.js  
Vue.js  
Web dashboards and diagnostics  
Android tablet UIs  
Git and CI/CD

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## PROJECTS

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### Clausi

Designed and built a production ready SaaS platform for automated AI compliance auditing across software codebases. The system scans source code against regulatory frameworks including the EU AI Act GDPR HIPAA and SOC 2. Architected the platform using Next.js fourteen FastAPI and PostgreSQL with OAuth two authentication via Google and GitHub Stripe based token billing and JWT secured APIs. Implemented retrieval augmented multi agent analysis pipelines that identify compliance gaps summarize findings and generate structured audit reports. Supported both bring your own key and hosted AI execution models to optimize cost and scalability. <https://www.clausi.ai/>

### ChangeUs

Designed and built a full stack AI driven workflow automation platform using FastAPI Next.js and PostgreSQL. Implemented large language model based routing logic for unstructured inputs multi step decision workflows and real time dashboards. Led system architecture data modeling authentication billing and deployment as a solo founder demonstrating end to end ownership of production software systems. <https://www.ChangeUs.org>

### Instrument Data Pipeline

Developed a comprehensive test data pipeline for manufacturing and hardware validation environments. The system ingests electrical and environmental test data from burn in testing HiPot testing in circuit testing isolation resistance testing and laser profilometry. Implemented ETL pipelines for normalization statistical analysis and real time visualization. Built statistical process control charts capability analysis and automated quality reports enabling actionable feedback for hardware and manufacturing teams  
<https://github.com/earosenfeld/instrument-data-pipeline>

### RobotTestBench

Created a Python based simulation and test framework to support actuator and sensor development for advanced robotics systems. The platform models motor dynamics including inertia damping and back EMF simulates encoder and joint feedback with noise and hysteresis and validates PID control behavior with anti windup strategies. Designed to mirror real dyno and hardware in the loop environments enabling control tuning fixture validation and performance analysis before deployment to physical systems. <https://github.com/ethiarosenfeld/RobotTestBench>

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## EDUCATION & EXTRACURRICULAR

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### Undergraduate Bachelor of Science in Mechanical Engineering GPA 3.714–

*San Jose State University, Concentration in Mechatronics*

Recognitions: Dean's Scholar Award | **Material Engineering Promise Award** | **National Society of Collegiate Scholars** | Radiation Isotope Safety Certificate | **Mechatronic Scholarship** | ASES Published Paper | DOT Webinar

Club Affiliations: ASME | The Engineering Honor Society | STEM club | SCE Club | Robotics Club