Michael Lawrie

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Hardware systems architecture and technical leadership · robotics · manufacturing automation · machine vision · simulation · AI agent systems

SUMMARY

Hardware systems engineer and technical leader who takes precision automation from requirements and architecture through validation and volume production: led $500M+ of automation across my career, including 4 iPhone launches, directing hundreds of people across contract manufacturers and vendors, co-built a machine-vision simulation product, and now architects and operates an AI coding-agent platform. Looking to lead hardware and software engineering for robotics, physical AI, and AI hardware.

WORK EXPERIENCE

Independent AI Systems Engineer **August 2026 – Present**

Building since January 2026; full time since August 2026; figures as of Oct 2026

- Architect and operate a software engineering platform spanning 9 machines and 99 repositories, averaging about 63 merged pull requests a day across 57 repositories, with 4,768 tracked agent runs in 30 days. Direct the AI coding agents (Claude, Cursor, Codex, and open-source models), and set the standards and acceptance criteria.
- Made the agents reliable the way I make a machine safe. Failures and anticipated risks become permanent guards, from blocked destructive commands to a two-step push confirmation, separate checks catch any guard that goes missing, and independent AI reviewers must pass every pull request in the main repositories.

Industrial Dynamics, Co-founder and CEO **January 2025 – July 2026**

- Co-founded the two-person company to take the hardware trial-and-error out of machine-vision deployment, a problem I'd lived with at Apple. Led fundraising (including the financial model), customer acquisition, and software architecture, shaped the roadmap, and ran legal, accounting, and compliance.
- Cut vision-system design from 36 days to 1.5 days per project (measured with our channel partner) with the Industrial Dynamics Vision Studio (IDVS), a physics-based digital twin on NVIDIA Omniverse for virtual commissioning and synthetic training images with physically rendered defects. Co-inventor on the provisional patent application.
- Built the sim-to-real validation pipeline: conventional and telecentric camera calibration, image registration, a photometry and MTF blur model, and preflight guardrails that stop a bad run before heavy compute. Captured real frames over GigE Vision and built packet-capture tooling (tshark, pktmon) to trace communication issues.
- Built and ran the IDVS cloud platform on AWS and Azure: multi-tenant streaming of Omniverse sessions from GPU hosts to the browser over WebRTC, with OIDC login, token-gated access, firewalling, and autoscaling driven by GPU availability and demand.
- Packaged headless Omniverse and Isaac Sim for rented Linux GPU hosts: an idempotent 10-phase host bootstrap (Docker, NVIDIA toolkit, SSH hardening, default-deny firewall) and a batch render worker with a JSON Schema job contract.
- Built an optical test bench with ±5 µm part-positioning repeatability to calibrate IDVS against real cameras, lenses, and lighting and measure the sim-to-real gap.
- Ran 30+ customer evaluations, including 10 OEM and integrator pilots, and won four paid design projects in the first six months. Paying customers included top-10 automotive and aerospace companies.
- A top-10 Tier-1 changed its camera and lighting plan across 80 plants based on our simulation, a top-5 Tier-1 wanted a license, and 2 Tier-1s scoped writing IDVS into machine specs.
- Partnered with ABB through Allied Vision, built 5 camera, optics, and lighting integrations (2 with co-marketing), and signed a consulting retainer with a system integrator in India that sells manufacturing equipment to Apple.
- Ran the pre-seed raise with $2M target (Alchemist Accelerator C41, Demo Day), and made the call to wind the company down when optical vendors would not provide the lens and sensor data we needed to scale because they were concerned competitors would use our software to benchmark and one-up their designs.

Apple, Lead iPhone Advanced Manufacturing Engineer, FATP **December 2021 – January 2025**

- Led the design, deployment, and optimization of $500M+ of automation equipment and retrofits across my career, including 4 iPhone launches at above 99.5% yield, with each machine held to its price target.
- Directed hundreds of people across contract manufacturers and vendors: contract manufacturers on factory layout, input routing, and build coordination, and vendors on new machine design, retrofit kits, SOPs, and delivery acceptance criteria.
- Led the definition of a standardized, fully linked line architecture for FATP, from conveyors, pallets, and datums to robot mounting, controls and motion, software architecture, futureproofing, and safety. It also covered vendor selection, tolerance analysis, and line bring-up standards. The definition was refined through the NPI builds and taken to mass production.
- Coordinated over 275 unique machine-related processes for New Product Introduction (NPI) builds as team lead of 4, defining process requirements with cross-functional teams, performing failure analysis, running the stress tests, and making sure lines hit OEE targets. Helped hire for the team.

- Ran engineering builds at CMs in China, on site about 90 days a year, as the main point of contact for FATP machine-related issues, and led bring-up of the first golden lines and the production lines in China and India, handling scaling issues, with every new line matched to a qualified golden line before it ran production.
- Kept the 275 machines and retrofit kits within budget by aligning automation design, mechanical and product design, contract manufacturers, CapEx, and GSM sourcing on machine specs, line layout, equipment pricing, and component availability.
- Worked with CM and vendor leadership in China to bring the right engineers onto machine-design and manufacturing problems.
- Saved about $60M in CapEx with a machine that places a shim behind each button clip so tactility stays within spec on every button. Six-axis robots with piezoelectric optical stages and custom machine-vision guidance install every shim at once.
- Saved about $55M in CapEx with a first-of-its-kind machine that threads a thin flex circuit through a narrow bore, which people thought was “impossible”. Set priorities and led process development under cost, part, and measurement constraints with the system-integration partners and CMs. Other lines of business later adopted the process.
- Hit a ±50 µm surface spec across a new button with a UV-laser machine that welds a clip onto the button pistons. Designed the datuming and selected components from Monte Carlo tolerance stack-ups, then defined the setup and scaling practices for mass production. Brought in at EVT, where equipment changes normally stop, so the new camera button could ship.
- Defined, designed, validated, and scaled automated machines at above 99.5% yield, including pick-and-place, pressing and press-fit, PSA application, epoxy dispensing, UV cure, plasma cleaning, laser welding and etching, hot-bar soldering, auto-screw, battery install, and camera-module install with active alignment.
- Established, reviewed, and released test and production processes, with SOPs for every machine. Defined datums (GD&T) and performed part and process tolerance analysis, established 2D and 3D machine vision flows, and designed gauges, incoming part layouts, incoming quality checks and workpiece holders.
- Specified machine parametric outputs, pushed for design changes to simplify assembly and test routing, and tuned process parameters to cut cycle time, reduce CapEx, and improve yield, using PFMEA, control plans, SPC, gauge R&R, DFM/DFA, and 8D.

EMCORE Corporation

Manufacturing Automation Manager *March 2021 – November 2021*

- Managed 3 engineers, including hiring and performance reviews, and led process redesign and automation of quartz MEMS accelerometers and gyroscopes for aerospace and defense under ITAR, scaling production up to 10x and raising yield by 30%.
- Came up with and led R&D on laser milling of quartz, delivering $2M in annualized savings in operator costs and yield recovery. Identified fiber-optic gyroscope coil winding as a major cost and bottleneck, then developed and automated the process.
- Led EMCORE's additive manufacturing work (FDM, SLA, SLS, SLM), co-developing a custom SLM metal powder with thermal expansion (CTE) matched to the gyroscope coils and designing a topology-optimized structure to maximize heat dissipation for quartz gyroscopes. Pursued patents and materials for vibration damping, resonant-frequency tuning, and thermal performance.

Sr. Automation Engineer *July 2020 – March 2021*

- Automated the assembly of integrated optical chips by designing fixtures, pneumatics, and controls and writing the PLC, HMI, and robot software, achieving < 50 µm repeatability with a SCARA robot, tool changer, and machine vision system. Designed in SolidWorks and NX; analyzed in Ansys and SolidWorks (FEA, CFD).

Starrett-Bytewise, Mechanical Design Engineer **July 2018 – July 2020**

- Sole engineer in opto-mechanical design of vision-based laser triangulation sensors, responsible for the full product life cycle. Released 2 new lines of high (8000 Hz) and low (< 300 Hz) speed sensors, 25% more accurate than the previous generation.

Pi Apps Squared, Founder and CEO **November 2009 – July 2014**

- Taught myself Objective-C at 14 and designed and released 8 iPhone apps. Sold the rights to 4 to an industry leader at 16.

PROJECTS

- Designed and 3D-printed 50+ parts at home in the past year. Built a custom nitro cold brew system with HomeAssistant nitrogen valve and custom C++ ESPHome code. Fine-tuned a bear-detection vision model. Built a local dictation app in Rust and Tauri.

SKILLS

Hardware and manufacturing: SolidWorks, NX, Ansys, GD&T, robotics, PLCs, machine vision, PFMEA, SPC, additive manufacturing
Software and AI: Python, MATLAB, C++, Rust, NVIDIA Omniverse, Isaac Sim, AWS, Azure, Docker, AI coding agents

EDUCATION AND CERTIFICATIONS

- University of Rochester, BS Mechanical Engineering, May 2018. Major GPA 3.52/4.00; Dean's List; Rush Rhees Scholarship for Academic Excellence; Fulbright Sutton Trust Scholar.
- MIT, Additive Manufacturing for Innovative Design and Production certificate, December 2020.
- College internship: **Google, Mechanical Engineering Intern, Verily Life Sciences** **May 2017 – August 2017**
  Automated nanomaterial concentration checks with microfluidics and a control system, enabling concentration measurement.
- College internship: **Laboratory for Laser Energetics, Research Assistant** **May 2016 – May 2018**
  Wrote MATLAB image analysis and x-ray imager simulations for 2x faster design iterations. Co-author of the published paper.