

Reed Nowling

Systems Engineering | Hardware Product Development | Rapid Prototyping

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Multidisciplinary systems engineer and hands-on product developer who takes loosely defined problems from concept to working hardware. First engineering hire and technical lead at an electric-watercraft startup; now a primary technical resource for commissioning and equipment integration at a commercial-scale mineral processing plant. Connects mechanical design, electrical hardware, embedded controls, software, and fabrication rather than relying on clean disciplinary handoffs. An engineering approach shaped by FIRST Robotics: learn quickly, build resourcefully, work closely with manufacturers, and test the complete system.

PROFESSIONAL EXPERIENCE

Calcean Minerals & Materials | Savannah, GA

Feb 2026 - Present

Electrical, Instrumentation & Controls Engineer

- Recruited to support a prolonged plant commissioning effort, investigating electrical, instrumentation, material-handling, thermal, and electromechanical issues affecting reliable production.
- Lead systems-engineering definition for the Gadsden-to-Savannah equipment transition as the **primary technical resource**, working alongside designated workstream leaders. Translate process needs into equipment requirements, utility loads, interfaces, operating sequences, and contractor scopes.
- Developed integrated equipment registers and electrical contractor packages covering equipment tags, motor and device schedules, planned loads, controls requirements, and inter-panel connectivity.
- Developing a fluidized-bed dryer conversion for product cooling, defining airflow and pressure needs, equipment modifications, instrumentation, and control concepts with vendors.
- Introduced an in-house 3D-scanning and point-cloud workflow for brownfield layout; developed a prototype engineering hub linking equipment data, electrical planning, process-flow diagrams, and sequence documentation.
- Analyzed ball-mill drive-train overheating using temperature measurements, lubricant data, and cooling-system specifications to develop corrective options.

eSki Watercraft | Worcester, MA

Oct 2021 - Present

Lead Engineer / Project Manager

- First engineering hire and primary technical owner, taking an electric personal watercraft from system architecture through mechanical/electrical design, fabrication, embedded integration, testing, and a working prototype.
- **Instrumental in securing acceptance into MassChallenge** and an active participant in the accelerator; supported investor-facing technical narratives and prototype demonstrations.
- Converted a Yamaha watercraft into an electric prototype, integrating a 230 hp PMAC drive, inverter, approximately 400 V battery architecture, charging, DC/DC conversion, cooling, and safety interlocks.
- Designed and built a liquid-cooled **2.5 kWh hot-swap battery** with a custom BMS and approximately 600 A peak capability; demonstrated it in an electric go-kart with **under \$25,000 in non-salary spend against a \$75,000 grant**.
- Worked closely with machine shops, suppliers, and manufacturing partners from design through prototype builds, balancing performance, manufacturability, cost, and lead time; fabricated and integrated prototype hardware.
- Supported patent applications for hot-swap and safety technologies through technical write-ups, system diagrams, and test data.

PROFESSIONAL EXPERIENCE | CONTINUED

Retlif Testing Laboratories | Goffstown, NH

Feb 2021 - Oct 2021

Electronic Test Technician

- Performed MIL-STD-461G emissions and susceptibility testing on defense and robotics hardware, building repeatable setups, executing test campaigns, and documenting results.
- Earned test-operator certification in the shortest time reported at the lab; worked with senior engineers and customers to diagnose failures and recommend design or layout changes.

Valet Park of America | Springfield, MA

May 2019 - Jan 2020

New-Technology Engineering Associate

- Pitched an automated-parking concept directly to the CEO and became its primary engineer during a nine-month co-op, taking the idea from business opportunity to a working headquarters pilot.
- Designed and built entry and exit machines integrating cash acceptance, credit-card payments, ticketing, gate hardware, C# user applications, and a SQL backend.
- Developed hardware/software interfaces and operational workflows while learning the required technologies; produced designs for a centralized payment station to support future expansion.

Aurora Flight Sciences | Cambridge, MA

May 2018 - Aug 2018

Robotics Engineering Intern

- Supported experimental robotics and autonomous-systems R&D through hardware prototyping, embedded programming, and test setup.
- Learned Python on the job to develop a flight-program scheduler and related tooling for aviation logistics and manufacturing simulations.

LHP Engineering Solutions | Columbus, IN

Jun 2017 - Aug 2017

Summer Intern

- Led mechanical design and algorithm development for an autonomous go-kart platform used as the starting point for Purdue's Autonomous EV Grand Prix; integrated sensors and controls with a small team to deliver working GPS-based navigation within one summer.
- Completed ISO 26262 training focused on control-software design, simulation, hardware-in-the-loop testing, and validation for vehicle-control applications.

TECHNICAL CAPABILITIES

Systems & product development: Requirements definition, system architecture, cross-disciplinary integration, trade studies, prototype development, test planning, fault diagnosis, and vendor coordination.

Electrical & product controls: Altium PCB design; analog/digital electronics; HV/LV architecture and harnessing; batteries, BMS, inverters, charging, and DC/DC integration; embedded controls; CAN, SPI, I2C, and UART.

Software & engineering tools: C/C++, C#, Python, SQL fundamentals, MATLAB/Simulink, LTSpice, and Multisim; SolidWorks, Autodesk Inventor, mechanical packaging, equipment layout, and point-cloud workflows.

Rapid fabrication & manufacturing: Extensive 3D printing; CNC mills and laser cutting; general shop equipment; basic welding; soldering, PCB rework, harness assembly, and fixtures. Close machine-shop collaboration and design-for-manufacture decisions throughout prototype development.

Industrial systems: Equipment and utility specifications, instrumentation selection, motor/drive troubleshooting, process-sequence and interlock definition. Developing Siemens TIA Portal / STEP 7 / WinCC and industrial PLC experience.

Test & startup execution: MIL-STD-461G testing, data acquisition, HV safety practices, prototype budgeting, procurement, technical storytelling, investor demonstrations, accelerator participation, and patent documentation.

FOUNDATIONAL ENGINEERING & LEADERSHIP

FIRST is the foundation of my engineering approach. Building a robot also meant helping sustain an independent team: learning unfamiliar technologies, making parts, finding manufacturing support, and earning sponsor trust. Mentorship from Cummins R&D engineers connected that resourcefulness with system-level thinking, practical testing, and a safety discipline that still guides my work.

FIRST Robotics Competition | Team 4926 GalacTech

2013 - 2017

Student Engineering Design Leader / Manufacturing Lead / Driver

- Joined a newly formed independent team and became its de facto technical leader, taking ownership across mechanical CAD, full-system design, prototyping, manufacturing, assembly, and sponsor engagement.
- Helped sustain a program with limited institutional support by securing funding, materials, equipment, and manufacturing assistance; helped raise **more than \$60,000 annually** through sponsor relationships, presentations, and technical demonstrations.
- Worked closely with Cummins R&D mentors to develop and fabricate complete competition robots under strict build deadlines, learning new engineering concepts through direct application and iterative testing.
- Served as the team's driver for all four years and a member of the pit crew, connecting design decisions with real operating behavior and troubleshooting under competition pressure.
- Helped lead the team to its **first state championship win and FIRST Championship appearance** during senior year; selected as a state finalist for FIRST's top individual student recognition during junior year.
- Developed lasting shop and prototype-safety habits through mentor-led expectations for PPE, safe equipment use, and awareness around moving machinery.

FIRST LEGO League

Coaching: 2014 - 2021

Student Competitor; Later Coach / Consultant

- Began teaching myself robotics and controls in middle school after joining a developing team; built fast multi-sensor PID line-following routines and experimented with third-party gyroscopic sensors before an official competition gyro was available.
- Returned as a coach and consultant, teaching PID control, gyroscopes and accelerometers, autonomous routines, and systematic debugging while encouraging students to learn independently.

Hyper Robotics | Independent BattleBots Team

2015 - 2017

Founder & Engineering Lead

- Founded and led a 10-person team pursuing selection for the BattleBots television competition, combining engineering leadership, prototype development, fundraising, and technical outreach.
- Secured **approximately \$50,000 in sponsorships** and an in-kind machining partnership; developed and iterated scale drivetrain and weapon prototypes to expose design flaws before full-scale fabrication.
- Produced the technical application package, including CAD models, wiring diagrams, safety-factor analysis, operating safety protocols, and the engineering narrative.

EDUCATION

Worcester Polytechnic Institute | Worcester, MA

2017 - 2021

Electrical & Computer Engineering Coursework

Completed 3.5 years of engineering coursework across electrical and computer engineering, computer science, physics, and aerospace engineering, including upper-level electronics and controls.