

Ing. Francisco Rosas | Product Development, Prototyping & Manufacturing

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PROFESSIONAL PROFILE

Automotive Engineering graduate specialized in the complete product development lifecycle, from mathematical conceptualization and CAD modeling to agile prototyping and high-precision manufacturing. Proven experience leading engineering and manufacturing divisions in high-stakes, competitive environments (FIRST Robotics). Expert in optimizing fabrication processes, resolving electromechanical integration challenges under critical constraints, and validating hardware components through iterative performance testing.

TECHNICAL SKILLS

- **CAD & 3D Modeling:** SolidWorks, Siemens NX, AutoDesk Fusion, OnShape, AutoDesk Inventor.
- **Manufacturing & CNC Control:** CNC machinery operation and programming, 3D Printing (FDM/SLA), Linux CNC, material selection, and advanced manufacturing processes.
- **Electrical Systems & Electronics:** Electronic system design, custom high-energy-density battery pack calculation and assembly, electromobility.
- **Development Tools:** GIT, thermal machines, mechanical and budget constraint analysis.
- **Languages:** Spanish (Native); English (C1 - Full professional proficiency).

PROFESSIONAL EXPERIENCE

Team Principal | BotBusters, PrepaTec Campus Eugenio Garza Sada *September 2022 – Present*

- **Supervise and unify technical criteria** across the mechanical design, advanced manufacturing, electronics, and software divisions for the construction of complex, high-competition robotic systems.
- **Manage engineering workshop infrastructure and operational control**, optimizing the utilization of machinery (CNC, 3D printing, milling machine) and managing inventory for critical engineering components.
- **Lead annual technological strategy and development timelines**, ensuring a seamless transition from initial design requirements to fully functional physical hardware under tight constraints.
- **Preside over institutional technical evaluation committees** and **manage hardware integration logistics** for international competitions.

Lead Engineering Mentor | BotBusters, PrepaTec Campus Eugenio Garza Sada *August 2019 – September 2022*

- **Direct the complete robot R&D and development lifecycle**, overseeing CAD modeling, initial assembly processes, and control system wiring.
- **Implement an agile prototyping and physical performance testing pipeline**, executing rapid failure analysis and immediate design iterations prior to final manufacturing phases.
- **Standardize manufacturing workflows for the workshop**, training over 30 students in blueprint reading and electromechanical assembly.

INDEPENDENT ENGINEERING PROJECTS

Unmanned Aerial Vehicle (UAV) Systems | Design & Programming *May 2024 – Present*

- **Design and manufacture custom autonomous unmanned aircrafts** (quadcopters and fixed-wing UAVs) from the ground up, integrating aerodynamic and structural constraints.
- Develop and fabricate **custom lithium battery packs**, calculating and optimizing variables such as energy density, thermal packaging, voltage, and current draw curves to meet mission profiles.

Computer Numerical Control (CNC) Equipment | Design, Manufacturing & Programming *April 2020 - Present*

- **Designed, parameterized, and built custom 3D printers and CNC routers**, translating torque and precision requirements into functional kinematic control hardware.
- **Executed technical selection and specification of critical electromechanical components** (stepper motors, lead screws, VFD, among others), balancing cost-performance ratios under established budget limits.
- **Responsible for corrective maintenance, geometric calibration, and firmware optimization** of machinery to ensure operational continuity.

QUALIFICATIONS

B.S. in Automotive Design Engineering | Tecnológico de Monterrey, Campus Monterrey *August 2018 – December 2023*

Engineering program focused on advanced mechanics, parametric 3D modeling, materials physics, electronic systems diagnostics, thermodynamics, and battery technologies for electric and hybrid vehicles.

TECHNICAL AWARDS & RECOGNITIONS

- **Engineering Excellence & Innovation Awards:** Recipient of consecutive national and international distinctions for Engineering Excellence, Industrial Design (awarded by General Motors), and Innovation in Control for developing robust, optimized control systems.
- **Silver Medal in Engineering Innovation:** Awarded at FIRST Global Singapore (2023) competing against projects from around the world.
- **Woodie Flowers Award Semi-Finalist (2024-2026):** Three-time consecutive international nominee by FIRST for exceptional technical mentorship, engineering leadership, and the transmission of agile workflows.
- **Outstanding Student of the School of Engineering (2023):** Highest institutional distinction for engineering students awarded by Tecnológico de Monterrey for technical merit, innovation project leadership, and academic excellence.