

FERNANDO VÁZQUEZ RIEFKOHL

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U.S. citizen • Relocating to Puerto Rico — available June 2027 • fernando-vazquez.netlify.app

PROFILE

Mechanical & aerospace engineering senior with a finance secondary major who builds validated models and tools that other people rely on, from helicopter demand forecasting at Bell to supersonic flight forecasting and engine cycle analysis. Bilingual (English/Spanish), Puerto Rico native, student pilot.

EDUCATION

Case Western Reserve University · *Cleveland, OH* *Aug. 2022 – May 2027*

- B.S. in Mechanical & Aerospace Engineering, Secondary Major in Finance • Expected Spring 2027 • GPA: 3.51/4.00
- Engineering coursework: Design & Manufacturing II, Fluid & Thermal Element Design (heat exchangers), Thermodynamics, Fluid Dynamics, Flight Mechanics, Orbital Dynamics, Dynamics, Control Systems, Circuits, Manufacturing, Differential Equations
- Finance & business coursework: Corporate Finance, Investments, Empirical Analysis in Finance, Money & Banking, Accounting, Entrepreneurship
- Hands-on labs: wind tunnel airfoil testing, circuits, machining and fabrication, group design projects

Universidad Carlos III de Madrid · *Madrid, Spain* • *Study Abroad* *Spring 2024*

- Thermodynamics, Fluid Mechanics, Control Systems, and Calculus IV, completed in Spanish within an international cohort.

Colegio San José · *San Juan, PR* *2020 – 2022*

- Coursework: Physics, Chemistry, Italian, Journalism

HONORS & AWARDS

- Hispanic Scholarship Fund (HSF) Scholar, 2026–27
- National Merit Scholar • AP Scholar • Hispanic Scholar

PROFESSIONAL EXPERIENCE

Sales Intern — Bell Textron Inc. · *Fort Worth, TX* *Summer 2026*

- Built a five-model demand-forecasting engine (market share, macroeconomic demand, purchase cycle, fleet replacement, product lifecycle) producing territory-level 5-year helicopter demand forecasts for 31 Latin American markets, replacing continent-wide averages.
- Designed an empirical-Bayes partial-pooling market-share model after backtesting showed share was predictable where total market volume was not, reframing the deliverable around the signal that actually existed.
- Validated every model change by walk-forward, out-of-sample backtesting across 21 years of order history and 1,300+ country-year forecasts (WAPE, bias, MASE, interval coverage); tested and rejected seven of my own hypotheses and documented each in a methodology whitepaper.
- Detected a competitor reporting lag that was inflating market share and built a detector that flags the affected year as provisional; found and fixed a rule that was wrongly removing an active customer from the forecast.
- Converted the forecast into a ranked pipeline of 500+ named accounts, split into defend, convert, and re-open blocks, each with a plain-English evidence statement a sales rep can defend; validated the confidence tiers against measured repurchase rates.
- Delivered a Streamlit/Plotly dashboard, self-generating executive reports, and a deployment-options assessment; shipped as a self-installing tool with one-click data refresh, a built-in health check, and 116 automated tests.
- Interviewed pilots, engineering managers, independent representatives, managing directors, and marketing; visited 9 Bell sites across DFW, including the Flight Research Center and headquarters.

Sales Intern — Bell Textron Inc. · *Fort Worth, TX* *Summer 2025*

- Developed the Bell 525's 500-hour Operational Evaluation plan: interviewed pilots, organized flight phases, and split the program into five blocks with task lists tracking completion of the Master Task Plan.
- Built a global weather-limitation tool over 13,000+ weather stations showing, for any aircraft's performance limits, where, when, and what percentage of the time it can operate.
- Used the tool to support competitive market analysis of the Bell 525 against other rotorcraft.

Operations Systems Consultant — Independent · Puerto Rico

Aug. 2026 – Present

- Built a Python schedule generator and self-validating Excel workbook for a 4-location retail chain (~20 staff, ~650 labor-hours/week), with a single editable sheet and a traffic-light validator a non-technical manager can run; saves the manager 16 hours (2 workdays) per 2-month schedule.
- Encoded the labor rules (max 10 h/day, max 5 consecutive days across week boundaries, holiday staffing, per-store payroll targets within $\pm 3\%$) so violations surface before the schedule is published.
- Designed a 5-week rotating master schedule for Farmacia Santa Ana (11 staff, 288 h/week) with four automated rule checks, so each month rolls forward from the last without rebuilding.
- Developing a local web app for Palmas Family Mart's CPA that classifies bank transactions into Sage 50 and pre-fills the month-close entry for three businesses sharing one account; the tool proposes, the CPA approves.

Inventory Manager — Palmas Family Mart · Humacao, PR

Summers 2021 – 2024

- Performed inventory audits and organized freight deliveries, streamlining inventory management.
- Managed cash operations for a \$1.6 million annual-revenue family business, including ATMs, slot machines, and bank deposits.

Welcome Team Receptionist — CWRU Undergraduate Admissions

Aug. – Dec. 2023

- Guided students and families through campus tours, applications, admissions, and financial aid; kept prospective-student records and scheduled meetings with department heads.

ENGINEERING PROJECTS

Mach Corridor — Supersonic Overland Flight Forecaster · Personal project

2026

- Designed and built a live web app that forecasts where supersonic aircraft can fly over land without the sonic boom reaching the ground, from NOAA GFS weather refreshed 4× daily.
- Implemented ray-acoustics Mach-cutoff physics (temperature, humidity, wind, terrain, lateral rays) for 36 headings $\times$ 7 flight levels worldwide, with an automated Python data pipeline on GitHub Actions.
- Validated against 4,283 weather-balloon soundings and 1,044 GFS forecasts (day-ahead error 0.015 Mach); a year-long, 7,632-flight hindcast showed forecasts capture 77% of the perfect-information benefit (28 min saved per overland flight).
- Designed a time-dependent route optimizer (grid search + continuous refinement) respecting 14 CFR 91.817 territorial limits, winds, acceleration, and fuel, and an economics model comparing Concorde, Boom Overture, Aerion AS2, and a NASA concept against the Boeing 787-9.
- Built interactive 3D visualizations in three.js tracing shock waves through the forecast atmosphere over real terrain, with take-off-to-landing route playback.

Baha Blast 1,700 cc Motorcycle Engine — EMAE 360 Design Project · Thermodynamics Team Lead

Fall 2026

- Built a parametric, crank-angle-resolved cycle model (slider-crank kinematics; p–V, temperature, and gas-force traces) where every result recomputes from a single input block.
- Ran a compression-ratio study (CR 8.5–11) showing efficiency rises 4.2 points while peak pressure rises 32%, framing the decision around knock margin and structural load.
- Ran a NASA CEA equilibrium analysis showing the ideal Otto cycle overstated peak pressure by 36%, correcting the peak piston force the mechanical team designs against from 99.9 to 64.3 kN.
- Disproved air cooling with a fin heat-transfer model (10.8× short even under favorable assumptions), locking liquid cooling.
- Estimated production cost at ~\$3,200/engine from a 27-line bill of materials with make-or-buy decisions, cross-checked top-down within 1.2%; audited the design spec and logged errors for correction.

Three-Body Perspective Viewer · Personal project

2026

- Built an interactive three-body simulator (adaptive RK4) showing the system from each body, the center of mass, and an inertial view at once, with a perturbed-twin mode to visualize chaos and an energy-error readout.

Other Public Projects · fernando-vazquez.netlify.app

2026

- Traffic Hotspot PR: web map of Puerto Rico traffic hotspots measured in hours of life lost.
- TRAINS PR: interactive model of a two-tier Puerto Rico rail network (regional + metro).
- Flight Demand Atlas: map of passenger flight demand against current flight supply.

HerbaTerra — Vertical Farming System

2024

- Designed a rainwater-collection, filtration, and closed-loop irrigation system; ran a Failure Modes & Effects Analysis; oversaw structural design of a system yielding 475 lbs. of produce per season.

CNC Aluminum Hammer • Expandable Skateboard

2023 – 2024

- Machined a hammer from aluminum stock to orthographic drawings on lathes, drills, belt sanders, and band saws, holding precise tolerances.
- Redesigned an expandable skateboard in SolidWorks; built and tested prototypes to improve design, materials, and weight.

ENTREPRENEURSHIP

Co-Founder — Hopeo (iOS app) • Puerto Rico

2026

- Built and shipped a Puerto Rico happy-hour discovery app on the App Store with subscriptions (RevenueCat) and analytics (PostHog): 247 first-time downloads, 16.8% product-page conversion, and 9 paid subscription plans.

Co-Founder (50%) — MSBI Group LLC • San Juan, PR

Jan. 2026 – Present

- Co-founded and registered a Puerto Rico LLC; built its 9-sheet financial model (scenarios, P&L, depreciation, cash bridge, 5-year projections) and a ~\$180K financing plan for a café and coworking space.

LEADERSHIP & ACTIVITIES

Co-Founder & Finance Director — Puerto Rican Student Association, CWRU

Aug. 2024 – Jun. 2025

- Co-founded the association to promote cultural awareness and community engagement; ran cultural events with 40+ attendees supporting Cleveland-area non-profits.
- Managed, budgeted, and allocated ~\$6,000 in annual university funding.

Member — Zeta Beta Tau, Lambda Chapter • CWRU

LICENSES & CERTIFICATIONS

- Student Pilot (ASEL) — FAA Private Pilot knowledge test passed (85%, first attempt); first solo Aug. 2025; checkride Nov. 2026; flown Cessna 152/172 and Piper Cherokee 180
- FE Mechanical exam: March 2027
- Certified SolidWorks Associate (CSWA) • DRNA Navigation License (Puerto Rico)

SKILLS & INTERESTS

Mechanical & Manufacturing: SolidWorks (incl. FEA and CFD simulation), AutoCAD, manufacturing drawings, 3D printing; machining (mills, lathes, drills, waterjets), welding, tool & die making; Arduino and circuit prototyping; wind tunnel testing; FMEA; BOM and make-or-buy costing.

Analysis & Software: Python (pandas, NumPy, SciPy, scikit-learn, Streamlit, Plotly, pytest), MATLAB, NASA CEA, Excel/Google Sheets modeling, JavaScript (D3, three.js), Git, CI/CD (GitHub Actions); AI-assisted software development.

Methods: Time-series forecasting, walk-forward backtesting, empirical Bayes, statistical analysis, numerical optimization, financial modeling (TVM, P&L, cash flow).

Languages: English & Spanish (fluent), Italian (intermediate).

Interests: Golf, aviation, boating, drones, spaceflight, travel.