SAM GHADDAR

Electrical and Electronics Engineer, AI-Focused

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EDUCATION

B.Eng., Electrical and Electronics Engineering (Co-op) *Sept 2021 – April 2026*

Concordia University *Montreal, QC*

Relevant coursework: ENGR 290: Engineering Design Project, ELEC 390: Engineering Design.

Training: WHMIS, Hazardous Waste Disposal.

SKILLS

Languages: TypeScript, Python, C++, Java, SQL, MATLAB

AI & Agent Systems: LLM agent orchestration, declarative skill/tool contracts, schema-validated frontmatter, model routing and cost tiering, context-budget architecture, description-driven dispatch

APIs & Data: OpenAPI 3.1, Zod runtime validation, PostgreSQL, Drizzle ORM, Node.js/Express, REST, generated typed clients

Validation & Platform: Deterministic invariant testing, CI gates, permission/policy rule design, Git/GitHub, Cloudflare R2

Frontend: React, React Native/Expo, React Query, English/Arabic RTL internationalization

Engineering & EDA: ROS2/SLAM, Siemens Capital, Altium, MATLAB/Simulink, PSpice, VHDL, Fusion 360, Shapr3D

Spoken Languages: English, French, Arabic

EXPERIENCE

Communications Systems Engineer Intern *June – Dec 2025*

Bombardier Inc. *Montreal, QC*

- Led troubleshooting of a critical aircraft connectivity failure, isolating the cause through bandwidth stress testing and Wi-Fi channel analysis.
- Confirmed the outcome through aircraft-level validation on the installed system.
- Documented aircraft Wi-Fi architecture to support system integration and future diagnosis.
- Documented aircraft electrical architecture across the same connectivity scope.
- Performed backshell installation, connector termination, and wiring, validating system functionality on completion.

Electrical Systems Engineer Intern *Feb – May 2025*

Bombardier Inc. *Montreal, QC*

- Researched electrical standards, insulation resistance requirements, and dielectric withstand voltage criteria in support of regulatory compliance.
- Applied those criteria to the design and optimization of power distribution and control systems.
- Extended the same design work to onboard communication systems.

Electrical Design Wiring (EWIS) Intern *Jan – June 2025*

Bombardier Inc. *Montreal, QC*

- Developed and refined aircraft wiring schematics in Siemens Capital.
- Built and revised harness definitions within the same Capital toolchain.
- Worked with Siemens NX at an introductory level alongside the wiring design work.

Electrical Engineering Intern *June – Aug 2023*

Rich Motor Company *Sharjah, UAE*

- Assembled and wired ATS, MTS, and synchronization control panels for generator systems, and produced CAD documentation for panel assembly and generator integration.

Solar Power Systems Engineer Intern *June – Aug 2022*

Alternative Energy Co. *Beirut, Lebanon*

- Designed and sized residential and industrial solar PV systems, supporting installation, commissioning, and performance monitoring.

Power & Generator Engineering Intern *May – Sept 2019*

Ghaddar Machinery Co. *Sidon, Lebanon*

- Supported mechanical assembly and electrical wiring of diesel generator systems while studying engine and generator operating characteristics.

PROJECTS

Claude-config | Global LLM Agent Configuration Framework *2026*

***Author**, open source*

github.com/SamGhaddar/claude-config

- Designed a machine-wide agent framework of seven auto-triggering skills and two model-pinned subagents, where dispatch is driven by declarative description contracts rather than manual invocation, routing bulk retrieval to a cheap model and visual verification to a vision-capable one to control cost per task class.
- Built a deterministic verifier asserting 68 structural invariants across five sections (prerequisites, router, skills, agents, hygiene), exit-code gated so the configuration can be validated in CI.
- Enforced schema contracts on every skill and agent through frontmatter parsing and validation, failing the check on malformed metadata, missing required fields, or unpinned agent models.
- Designed a 100-rule permission policy layer (75 allow, 23 deny, 2 confirm) with deny-precedence semantics, so a destructive operation cannot be silently re-enabled by a broader allow rule.
- Architected context budgeting for always-on instructions: a router file capped at an enforced 150 lines that points to detail files loaded on demand, plus a deny-by-default ignore policy that makes session keys and transcripts structurally unstageable rather than relying on discipline.

Revv | Premium Car Rental Marketplace *June 2026 – Present*

Co-Founder

revvrental.com | github.com/SamGhaddar/revv

- Co-founded and shipped a Lebanon-focused rental marketplace spanning Expo/React Native renter and host apps, an Express API, a React admin console, and a public website, in a TypeScript/pnpm monorepo on PostgreSQL and Drizzle ORM.
- Made a 157-path OpenAPI 3.1 contract the single source of truth, generating React Query and Zod clients so request and response shapes are validated identically at build time and runtime across every client surface.
- Delivered availability-aware booking, checkout, messaging, verification, inspections, disputes, and fleet operations, with integrations across Google Maps, Cloudflare R2, email, push, WhatsApp, and payment services.
- Hardened production correctness with booking-overlap protection under concurrency, role-aware authorization, idempotent refund reconciliation, CI gates, and English/Arabic RTL support.

C.H.A.R.G.E. | Multi-Robot Hazard-Mapping System (Capstone) *Sept 2025 – May 2026*

Concordia University *Montreal, QC*

- Developed ROS2/SLAM autonomous exploration routines for a seven-member team's multi-robot platform mapping fire, smoke, and abnormal events in closed industrial environments.
- Selected and integrated microcontrollers, LiDAR, IMU, depth, gas, flame, and temperature sensors into a unified sensing pipeline; contributed custom PCB design for sensing, power distribution, and motor control.
- Calibrated sensors, resolved hardware-software integration failures, and maintained schematics, wiring diagrams, and component documentation.

AI-Powered Recipe Application *Sept – Dec 2024*

Concordia University, 3rd of 20 teams *Montreal, QC*

- Built an Android application generating personalized recipes from food images using AI-based recognition, with constraint-aware output filtered against nutrition data and dietary preferences, plus authentication and profile flows.

Volkswagen ID.4 EV Powertrain Simulation *Jan – May 2026*

Concordia University *Montreal, QC*

- Modelled a full EV powertrain in MATLAB/Simulink (battery SOC and voltage dynamics, DC-DC conversion, inverter control, and PMSM torque/speed control), integrated with aerodynamic drag, rolling resistance, and road grade, then validated across acceleration, top-speed, and grade-climbing scenarios.

AWARDS & LEADERSHIP

2nd of 18 teams | Hovercraft CAD Design Competition

Team Lead, Concordia University *Montreal, QC*

- Led a five-person team designing and validating a functional Shapr3D hovercraft judged on design efficiency and operational performance.

3rd of 20 teams | AI-Powered Recipe App Competition *2024*

Team Member, Concordia University *Montreal, QC*

Vice President, Communications | Troitsky Bridge Building Competition *2025 – 2026*

Concordia University *Montreal, QC*

- Led a communications team of two directors, coordinating logistics, sponsorship visibility, and school outreach.

Electrical Systems Member | Concordia SAE Formula EV *2023 – 2024*

Concordia University *Montreal, QC*

- Designed and improved vehicle electrical systems in Altium through weekly team reviews.