Raphael Silveira e Silva

Belo Horizonte, Brazil | Available for Relocation to the U.S. | Visa Sponsorship Required  
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# Professional Summary

# Highly hands-on Mechanical & Mechatronics Engineer with over 15 years of experience in designing, prototyping, building, and commissioning custom mechatronic and automated systems from the ground up. Proven expertise in generating and iterating on complex systems, from precision motion and manipulation to full system integration (mechanical, optical, and electronic components) and bring-up. Skilled in integrating microcontrollers, PLCs, sensors, and actuators to deliver robust, functional solutions for advanced manufacturing challenges. A passionate problem-solver committed to owning the entire project lifecycle, from initial concept to wiring, firmware, and final field commissioning, aligning perfectly with Atomic Semi's "build-it-ourselves" philosophy.

# Key Skills & Areas of Expertise

* **Electromechanical System Design & Integration:** Precision motion, manipulation, sensor/actuator integration, industrial automation, robotics.
* **Controls & Electrical:** PLC/HMI Programming (**Siemens TIA Portal - Advanced Ladder**), Microcontroller Programming (**Arduino, Raspberry Pi - Intermediate Python**), PID Control, EPLAN, Sensor & Actuator Integration, Electrical Panel Design.
* **Opto-Mechanical System Design:** Integration of optical components (e.g., UV-C emitters) into mechanical systems, precision alignment, thermal management for optical elements.
* **Prototyping & Fabrication:** Rapid Prototyping (**3D Printing - FDM/SLA**), CNC Machining, Sheet Metal Design & Bending, Welding (**Mechanical & Electrical Components**), System Assembly & Bring-up, Troubleshooting.
* **CAD/CAE:** SolidWorks, Inventor, Siemens NX, AutoCAD, Fusion 360, Catia, FEA (**SolidWorks**), 3DS MAX, Tolerancing, GD&T, DFM/DFA.
* **Project Management & Documentation:** MS Project, Google Workspace, BOMs, 2D/3D Layouts, Schematics.

# Professional Experience

**SIMA Projetos e Soluções Industriais – Belo Horizonte, Brazil**

*Co-Founder & Engineering Director* | 2016 – Present

* Designed, built, and commissioned custom automation systems from concept to final product, leading the mechanical and electromechanical development for clients in healthcare, automotive, and advanced manufacturing.
* Personally handled **end-to-end hands-on execution, including mechanical assembly, component welding, electrical panel wiring, and on-site equipment commissioning**.
* Engineered and iterated on machines and subsystems for fabrication, focusing on integrating mechanical structures with custom control systems, sensors, and actuators.
* Led multidisciplinary squads as a development leader, fostering a hands-on, collaborative environment focused on rapid prototyping and practical, functional solutions.

**Highlighted Mechatronics & Automation Projects:**

**Autonomous UVC Disinfection Robot**

* + *Challenge:* Develop a fully autonomous robotic system for pathogen disinfection in critical environments, requiring a solution that was both effective and safe for remote operation.
  + *My Contribution:* As development leader, I designed the complete mechatronic system, integrating an Omron AMR platform with custom sensor arrays (LIDAR, vision) and **Arduino-based controls**. Personally handled the **3D modeling, weight distribution analysis, initial firmware programming for sensor and safety system integration**, and ensured robust safety interlocks.

**UV Curing System for Metal Printing (CMP Project)**

* + *Challenge:* Create a high-performance UV curing system for a metal printing line, requiring **precise control over multiple physical parameters** and safety compliance.
  + *My Contribution:* Executed the complete mechanical and electrical design and **programmed the Siemens PLC and HMI from scratch**. The system included **PID loops for LED temperature management, hydraulic flow control** for the cooling system, and variable current control for the electrical panel fans, all compliant with NR-12 safety standards. This project demonstrated robust **optomechanical integration**.

**Compact UV Curing System (Astergraf)**

* + *Challenge:* Integrate a UV curing system into a high-speed printing press with **extremely constrained space (less than 2mm tolerance to moving components)**.
  + *My Contribution:* Designed and **rapidly prototyped** an ultra-compact, water-cooled LED module housing and developed custom hydraulic connections unavailable on the market. **Iterated on the design using 3D printing and mockups** to validate fit and function before final fabrication, delivering industrial-grade reliability.

**Arduino-Based UV Curing Conveyor**

* + *Challenge:* Develop a cost-effective, automated conveyor system for instant adhesives, requiring precise UV radiation exposure and operator safety without a full industrial PLC.
  + *My Contribution:* Developed the complete end-to-end solution. This included the 3D/2D mechanical design of the conveyor and safety enclosures; hardware selection; and **development of the control system using an Arduino and a touch screen**. Personally **programmed the control logic and the interactive user interface, assembled and commissioned the electronics**, and oversaw final try-out. Designed mechanics to handle slender, lightweight products while safely integrating industrial UV emitters with the Arduino controller.

**AC Implementos Rodoviários – Contagem, Brazil**

*Mechanical Project Manager* | 2014 – 2016

* Directed the design of mechanical subsystems for trailers and road equipment, including hydraulic, locking, and suspension systems.
* Optimized parts for manufacturability (DFM) and reduced costs through component standardization.
* Coordinated with suppliers and internal teams during prototype testing and full-scale production.

**Fourmec Industrial – Belo Horizonte, Brazil**

*Mechanical Design & Managing Partner* | 2008 – 2014

* Led the design and manufacturing of custom machinery for clients in food processing, packaging, and logistics.
* Applied advanced modeling techniques for sheet metal, structures, and product enclosures.
* Developed automated platforms compatible with ABB/Fanuc robots and integrated pneumatic and hydraulic components to deliver turnkey solutions.

### Personal Projects & Passion for Design

My passion for building extends beyond my professional work. I frequently apply engineering principles to create custom solutions from scratch, moving from concept sketch to CAD and final fabrication in my own workshop.

* **Custom Montessori Bed:** Designed a unique cloud-shaped Montessori bed in Inventor, created detailed fabrication drawings in AutoCAD, and personally built it to meet a specific vision that was unavailable on the market.
* **Walk-in Toy House:** Engineered and constructed a custom walk-in toy house for my niece, managing the project from initial design to final assembly.
* **Therapeutic Game for Social Project:** Modeled a therapeutic game in Autodesk Inventor, detailed laser-cut components in AutoCAD, and sliced the models for 3D printing to support a university social project for the elderly and individuals with learning difficulties.

# Education

**Bachelor of Science in Mechanical Engineering**

Centro Universitário de Belo Horizonte (UNIBH), Brazil – 2021

# Certifications

**NR-12 Machinery Safety Certification**

Certified in Brazilian industrial safety standard (Comparable to OSHA standards – Emphasizes safe machine design, guarding, ergonomics, and operator training).

**Basic Python Programming**

Acquired foundational skills in Python for engineering applications, including scripting, logic, and basic automation tasks.

# Languages

**Portuguese:** Native | **English:** Fluent | **Spanish:** Working Proficiency

# Work Eligibility

Brazilian citizen | Requires sponsorship | Available for immediate relocation