

# MARTÍN TOUS

M.Sc. Mechatronics Engineer specialized in end-to-end product development, bridging hardware and software. Proficient at taking projects from concept to working prototype using C/C++, Python, and MATLAB. Strong versatile background with hands-on experience in embedded systems, robotic prototyping, machine vision, and mechanical design.

Brussels, Belgium

Portfolio: [martintous.com](https://martintous.com)

Linkedin: <https://www.linkedin.com/in/martin-tous/>

Phone: +32 497 59 03 76

Email: [martint24.06@gmail.com](mailto:martint24.06@gmail.com)

## Key academic & personal projects

### Gesture-controlled Mobile Robot with Robotic Arm

ATmega328P, Arduino, C, servos

- Designed electronics and firmware for a mobile robot with a **two-axis gripper**; implemented **motor control** and **UART/I2C**-based sensor communication; delivered a working prototype capable of performing basic pick sequences.

### Remote Control System for Mobile Robot

Unity3D, VR, 3D prototyping, AI hand recognition

- Built a Unity-based simulation and VR interface with AI hand-recognition for remote robot control; produced 3D designs and physical prototypes to validate interaction and control workflows.

### 3D Printer

Arduino, stepper control, mechanical design, firmware

- Designed and assembled a complete FDM printer (mechanical frame, electronics and firmware), iteratively tuned hardware/software and validated prototypes for reliable printing.

### Robotic Arm Trajectory Implementation

MATLAB (Peter Corke toolbox), Python, Arduino/C++

- Computed forward/inverse kinematics and simulated linear trajectories; implemented and validated trajectories on a 5-DOF prototype using Python scripts and Arduino firmware.

### Quadruped mobile robot

Lagrangian dynamics, Webots, actuator & sensor selection

- Derived the dynamic model via Lagrangian formulation, selected actuators/sensors and ran kinematic/dynamic simulations in Webots to validate motion and control strategies.

### Recycled Filament Extruder & 3D Printing

Arduino, stepper control, power electronics

- Designed and built an extruder for recycling PET bottles into 3D printing filament; prototyped mechanical and electronic subsystems; produced ~25 g filament from 1.5 L bottle in lab tests.

### Quadcopter control system modeling

MATLAB/Simulink, control systems, signal simulation

- Modeled quadcopter flight dynamics and control in MATLAB/Simulink and simulated sensor data acquisition and interference/noise to evaluate controller robustness and performance.

### Computer Vision for Object Recognition & Distance Measurement

MATLAB, Python

- Built a full pipeline for recognizing washers, nuts, screws and estimating lengths; trained classifiers and validated results. Achieved 94% test accuracy and ~1 mm length error.

## Work experience

- Accessory Development Engineer — Toyota Motor Europe (contractor via ALTEN Belgium) · Brussels (Hybrid) · Aug 2024 – Present**
  - Lead full product lifecycle for electrical accessories (feasibility → prototyping → mass production), ensuring Toyota performance, quality and cost targets.
  - 3D wire-harness & part design in CATIA, electrical wiring diagrams (EWD), prototype fit checks and fire-hazard assessments.
  - Coordinate supplier testing, validate test reports, run FMEA/DRBFM and liaise with production to ensure inline installability and regulatory compliance.
- Artificial Vision Developer — ANT Automation · Buenos Aires – Argentina (Remote) · 2023 – 2024**
  - Developed computer vision modules for industrial inspection and prototyping.
  - Implemented image processing and integration with hardware (cameras, sensors and control systems).
- Robotics Teacher — Queen Mary High School · 2023**
  - Led practical robotics workshops for high school students; focused on hands-on prototyping and basic control concepts.
- Founder & Engineer — MT3D Print (3D printing entrepreneurship) · 2020 – 2023**
  - End-to-end product prototyping: mechanical design, electronics, firmware and production of custom 3D printed parts.

## Skills

### Technical / Engineering

- CAD & Simulation** | SolidWorks, NX, CATIA V5, Solid Edge, Fusion 360, AutoCAD, Webots, Unity.
- Programming & Control** | C, C++, Python (OOP), MATLAB / Simulink / Stateflow, PLC programming (Ladder, FBD, ST).
- Embedded & Firmware** | AVR (ATmega), ARM basics, Arduino; microcontroller firmware, UART / I2C communications, motor control (DC / stepper / servo).
- Electronics & Instrumentation** | Analog & digital circuit design, power electronics, wiring harness routing, EWD/wiring diagrams; hands-on use of multimeter and oscilloscope.
- Robotics & Controls** | Kinematic and dynamic analysis (serial, mobile, parallel robots), control system modelling, trajectory planning, sensor selection and integration.

### Tools & Workflow

- Git, Linux, Microsoft Office, basic PCB/prototyping tools, test lab coordination.

### Practical / Hands-on

- Rapid prototyping (mechanical & electronic), bench testing and validation, prototype fitting and troubleshooting, inline-installation readiness reviews.

### Soft Skills

- Effective communicator · Team player · Leadership & coordination · Organized & meticulous · Autonomous problem-solver · Curious and quick learner.

## Education

**M.Sc. Mechatronics Engineering** — Cuyo National University, Mendoza (Mar 2018 – Feb 2024). GPA: 8.92/10.

## Languages

- Spanish: Native
- English: B2 - Professional working proficiency
- French: A2 - Elementary proficiency