Belal A. N. Abdelkarim

Mechanical Engineer · R&D Prototyping · 3D Design & Visualization

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Summary

Mechanical Engineering graduate from Abdullah Gül University (2026), now pursuing an MSc in Electrical and Electronics Engineering in Istanbul, focused on mechanical design and R&D prototyping. Completed two internships at Teknopark startups in Kayseri, designing and delivering real hardware at both. Seven years of professional 3D production in Blender running in parallel — modelling, texturing, animation, rendering. The overlap is deliberate: I design parts, print them, and visualize them.

Education

Abdullah Gül University — Bachelor of Science
Mechanical Engineering — Kayseri, Türkiye • 2022 – 2026

İstanbul Sabahattin Zaim Üniversitesi — Master of Science
Electrical and Electronics Engineering — İstanbul, Türkiye • 2026 – Present

Experience

Masswell Advanced Energy Systems — Erciyes Teknopark, Kayseri
Mechanical Design Intern — Aug – Sep 2025

- Designed and 3D printed the full enclosure system for a lithium-ion forklift battery — BMS housing, fire safety holder, power supply container, resistor case, and screen mount
- Built all models in SolidWorks from physical measurements; printed in-house in PLA and iterated on tolerances when parts failed
- Applied FDM anisotropy principles to fix structural column fractures — reoriented print axis and added fillets at stress concentration points, resolving the failure without adding material
- All five components shipped inside a battery delivered to a client

MTM Biotechnology — Erciyes Teknopark, Kayseri
Mechanical Design Intern — Jun – Aug 2025

- Only mechanical designer on three concurrent wearable medical device housings: a smart headband measuring stress, temperature and blood pressure, an EMG muscle sensor, and a smart earbud
- One project arrived as a verbal description with no sketches or CAD reference — produced a complete 3D model, internal component layout, and photorealistic renders for stakeholder review
- Iterated on enclosure geometry to maintain sensor contact with skin while keeping parts compact and 3D-print-ready; coordinated dimensions with the electronics engineer on each device

Freelance — Remote
3D Artist — 2017 – Present

- Product visualisation, modelling, texturing, and animation in Blender across seven years of client work
- Delivers complete renders from brief to final output — lighting, shading, Cycles rendering, and compositing in DaVinci Resolve and Photoshop

Projects

Ultrasonic Pulse-Echo NDT Device 2026 – Present

- Developing a low-cost ultrasonic pulse-echo device for non-destructive testing, using 1 MHz ultrasonic transducers in place of an expensive commercial NDT probe
- Phase 1 runs on an ESP32 with acrylic as the first test material; FPGA-based acquisition planned for Phase 2

Self-Balancing Two-Wheel Robot 2024 – 2025

- Designed the chassis in Blender, 3D printed it, wired the electronics by hand, and wrote the full firmware in Arduino C — the entire system built alone
- Implemented a cascaded PID architecture: an inner tilt-angle loop for balance and an outer velocity-feedback loop for controlled forward and backward movement
- Achieves stable balance within ±0.5° of setpoint using only an MPU6050 IMU and a complementary filter — no wheel encoders, no optical sensors
- Resolved I2C bus corruption from motor EMI through isolated power domains, twisted-pair wiring, and a firmware bus-reset timeout; all PID parameters tunable live over Bluetooth without reflashing

Volunteer

English Speaking Club — Host · Kayseri Gençlik Merkezi 2024 – Jul 2026

Kayseri, Türkiye

- Hosted weekly sessions for 8–25 participants over two years; devised topics and created an environment where people felt comfortable making mistakes
- Progressed from member to host

Board Member · AGÜ International Association (AIA) Oct 2024 – Sep 2025

- Organised events for the international student community at Abdullah Gül University

Skills

Mechanical Design

SolidWorks, FDM 3D printing, Blender, DFM, Heat-set inserts

Embedded Systems

Arduino C/C++, ESP32, Cascaded PID, Sensor fusion, I2C · Bluetooth serial, Ultrasonic sensing

3D Production

Blender, Modelling, Texturing, Animation, Cycles rendering, DaVinci Resolve

Languages

Arabic (native), English (advanced), Turkish (basic)