

Luca Obwegs

Control Engineer · M.Sc. Mechatronics & Robotics

I take controllers from simulation to reliable real-time code on resource-constrained hardware.



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EXPERIENCE

Control Engineer

Oct 2023 – Present

Hilti · Mechatronics and Robotics Systems Laboratory

- Develop control software for robotic and mechatronic prototypes for the construction industry.
- Model and simulate systems in MATLAB / Simulink; design controllers and state estimators.
- Implement embedded C / C++ on target hardware and test, tune and debug complete systems.
- Collaborate with mechanical and electronics engineers from prototype concept through hardware validation.

Research Intern

May 2022 – Jan 2023

Munich Institute of Robotics and Machine Intelligence (MIRMI)

- Developed a tri-axis tactile force sensor and worked on sensory signal processing and experimental validation.
- Contributed to research accepted at IEEE World Haptics 2023.

EDUCATION

M.Sc. Mechatronics and Robotics

2021 – 2023

Technical University of Munich (TUM)

Focus on control theory, embedded systems and robotics. Final-semester exchange at KAIST in Daejeon, South Korea, including voluntary bilateral-teleoperation research.

B.Sc. Mechanical Engineering

2018 – 2021

Graz University of Technology (TU Graz)

Thesis: *The Influence of Various Turbulence Models on the CFD Simulation of an H-Darrieus Turbine.*

CORE SKILLS

CONTROL

PID, cascaded control, LQR/LQI, MPC/NMPC, adaptive and sliding-mode control, impedance and force control

STATE ESTIMATION

Kalman filter, EKF, multiplicative EKF, IMU/barometer/GNSS fusion, parameter identification

SOFTWARE

C / C++, Python, MATLAB / Simulink, ROS 2, micro-ROS, Linux, Git

EMBEDDED & HARDWARE

STM32, ESP32, Raspberry Pi, UART, SPI, I²C, CAN, PCB design, CAD, 3D printing

LANGUAGES

German	FLUENT
Italian	FLUENT
English	FLUENT
Ladin	FLUENT

SELECTED PROJECTS

01

Two-Axis Robotic Tracking Platform

Built a two-axis mechanism and simulation with stepper-servo dynamics, encoder filters, a nine-state EKF, camera/range-sensor fusion and delayed-measurement compensation on STM32H7 hardware.

STM32H7 · EKF · Sensor fusion · 10 kHz control

02

Custom 3D-Printed Quadrotor

Designed the airframe, simulation and embedded flight software from scratch, including attitude and altitude estimation and cascaded flight control.

STM32 · C/C++ · Simulink · MEKF · Cascaded PID

03

Six-Axis Robot Arm

Developed a fully 3D-printed 6-DOF arm with numerical inverse kinematics, closed-loop joints, teach-in operation, custom GUI and ROS 2 / micro-ROS integration.

ROS 2 · Kinematics · Arduino · Raspberry Pi · 3D printing

04

Bilateral Teleoperation at KAIST

Implemented passivity-based force and position control for Phantom robots under communication delay, with adaptive inverse dynamics, impedance and sliding-mode controllers.

Teleoperation · Passivity · Force control · Adaptive control

PUBLICATION

S. Groß, **L. Obwegs**, J. Li, T. Spiegeler Castañeda, A. Ganguly, C. Piazza, and S. Haddadin, *Transforming Tactile Interfaces: Tri-Axis Force Sensor for Sensory Signal Processing*, IEEE World Haptics 2023, Delft.

INTELLECTUAL PROPERTY

Stop Assist for SID — data-driven automated stopping controller for assisting operators in driving screws. Patent filed; 50% contribution.

ADDITIONAL EXPERIENCE

KAIST Exchange, South Korea

Autonomous-systems coursework and voluntary teleoperation research, 2023.

M2 Railtech

Summer internships in mechatronic design, microcontroller programming, PCB design and prototyping.

Aerospace Team Graz

Mechanical engineering, propulsion testing, systems teamwork and team leadership.