Kosma Krzyżanowski

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Education

Master of Science - Systems and Control *2024-present*
Delft University of Technology
Courses: *Control Theory, Filtering and Identification, Machine Learning, Statistical Signal Processing, Optimization, ...*

Bachelor of Science - Aerospace Engineering *2020-2023*
Delft University of Technology

Pre-Master - Moral and Political Philosophy (Part Time) *2025-present*
Leiden University

Professional Experience

Delft Hyperloop *2023-2024*
Chief Engineer
Team developing a Hyperloop prototype, ***demonstrated a first fully scalable Hyperloop lane switch***

- **Project Management**: Planned and executed the design, manufacturing, and testing of an advanced Hyperloop prototype with a team of 25 engineers.
- **Systems Engineering**: Ensured smooth integration of mechanical, levitation, propulsion, sensing & control, and power subsystems. Oversaw the control system architecture of the prototype.
- **Verification & Validation**: Led requirements generation and decomposition; planned and executed 35+ subsystem and system-level integration tests covering performance, operations, fault detection & handling.

Delft Aerospace Rocket Engineering, Stratos V, NEAR *2021-2023*
Propulsion and Active Apogee Control Engineer
Student team developing liquid bi-prop rocket to reach an apogee of 35km and demonstrate reusability

- **Propulsion and feed system design**: Designed a Quick Disconnect system - requirements, conceptual, detailed design, manufacturing and testing plan. Designed a cold flow test setup. Analysed hot fire test data.
- **Mechanical Design**: Optimized the functioning of the airbrake deployment mechanism by implementing a permutation based **Python** algorithm to decrease the acting friction forces, resulting in a **50% decrease** in the torque required, compared with the initial design.

Refinitiv (London Stock Exchange Group) Metadata Analyst *2019 - 2020*

- **Data Analysis**: Analysed commodity reference data using Excel and SQL; built classification rules and conducted standards research to improve data quality and consistency.

Projects

2nd place at Buildarena Hackathon, Stockholm (Python, MPC, Simulation): Built a full engagement simulation for 5+ agents in under 24 hours. Designed a hierarchical control stack: auction-based task allocation, pincer-maneuver geometry, and local MPC for terminal guidance. (2026)

Bank Heist Robot (MPC, Pinocchio, PyBullet, cvxpy/OSQP): Built a real-time MPC controller for a nonlinear mobile manipulator by linearizing dynamics online and solving a constrained QP with collision avoidance via tangent-plane constraints and slack variables. (2025)

Furuta Pendulum Control (Modelling, Identification, Control): As part of the DCSC Integration Project, modelled the dynamics, identified and designed LQR and MPC controllers for a Furuta-style pendulum. (2025)

Robotic Arm with Computer Vision (Python, Computer Vision, Control, Linux, Raspberry Pi): Fully designed, manufactured and programmed a robotic arm to pick up objects and manipulate them based on the inputs from a camera using OpenCV and inverse kinematics for motion planning. (2023)

Skills Summary

Control Eng.	PID, LQR, MPC, System Identification, Modeling, Sensor Fusion, Optimization, Distributed, Networked, Optimal, Stochastic Control, Game Theory
Programming	Python (NumPy/SciPy), MATLAB/Simulink, C++
Solvers	CVX, OSQP, Gurobi **Tooling:** Git, Linux
Management	Project management, Stakeholder management, Leadership, Public Speaking
Languages	English (fluent), Dutch (beginner+), Polish (fluent)