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

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)

Winner of Project X – NATO, Boeing, Unmanned Valley Design Sprint: Designed an autonomous collaborative drone system for application in rapidly changing environments. Developed a **decentralized, token based decision making solution** allowing for unprecedented scalability and robustness. (2022)

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)