Aaron Dsouza

M.Sc. Student at TUM | Robotics & Control Engineering

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Education

Technical University of Munich (TUM) — Munich, Germany
M.Sc. Mechatronics, Robotics and Biomechanical Engineering — *Oct 2025 – Present*
- Selected coursework: Robotics, Robot Dynamics, Advanced Control, Nonlinear Control and Physics Informed Machine Learning.

THWS, Technical University of Applied Sciences Würzburg Schweinfurt — Schweinfurt, Germany
B.Eng. Mechatronics — *Oct 2020 – Oct 2024*
- Relevant modules: Control Systems, System Theory, Robotics and Production, Actuators, Embedded Systems and Fieldbuses.

Professional Experience

Daimler Truck AG — Wörth am Rhein, Germany
Student Production Employee (Ferienbeschäftigung) — *Aug 2026 – Present*

Airbus Defence and Space GmbH — Immenstaad, Germany
Bachelor's Thesis: Software Development of ATTS Post Processing Tools — *Apr 2024 – Sep 2024*
- Developed Python and MATLAB postprocessing modules for the Airbus Thermal Tool Suite to automate analysis and visualisation of spacecraft simulation results.
- Analysed the thermal and mechanical response of spacecraft models with Airbus engineering tools to support technical assessment.
- Migrated and debugged processing workflows and validated outputs to maintain reliable simulation reporting.

Airbus Defence and Space GmbH — Immenstaad, Germany
Engineering Intern, Thermal Tool Suite Development — *Jul 2023 – Dec 2023*
- Simulated spacecraft thermal behaviour in Systema and ESATAN to support thermal engineering assessment.
- Developed preprocessing and postprocessing utilities in Python, MATLAB and Fortran for repeatable simulation data processing and reporting.

Hightech Electronic GmbH — Geldersheim, Germany
Working Student (Werkstudent), Production and Testing — *Mar 2022 – Dec 2022*
- Assembled and tested battery modules in series and parallel configurations for integration into Fresenius dialysis systems.

Selected Projects

Robot Modeling, Identification & Control Laboratory | *MATLAB/Simulink* — *Summer Semester 2026*
- Modelled planar serial robots using modified DH parameters, homogeneous transformations, Jacobians and Lagrangian dynamics.
- Identified inertial parameters using Fourier excitation trajectories, minimal regressors and least squares estimation.
- Implemented PI/PID, computed torque, Lyapunov based adaptive and impedance controllers, state feedback, Luenberger and disturbance observers, and force/collision observation.

Physics Informed Neural Network for a Damped Oscillator | *PyTorch* — *Summer Semester 2026*
- Implemented a physics informed neural network using eight measurements and differential equation residuals at 200 collocation points to reconstruct the continuous time response of a damped oscillator.

Real Time Object Detection and Tracking | *Python, OpenCV, NumPy* — *Jan 2023 – Feb 2023*
- Implemented object detection and tracking from live webcam input using Haar cascade classification, contour extraction and bounding boxes.

Technical Skills

Programming: Python, MATLAB, C/C++, Fortran, SQL

Engineering Software: MATLAB/Simulink, ROS/ROS2, Systema, ESATAN, OpenCV, Linux, Git, Docker

Robotics & Control: Robot kinematics and dynamics, Jacobians, trajectory planning and tracking, PID, computed torque, adaptive control, nonlinear control, impedance control, parameter identification, state space control, observers, force/collision observation

Modelling & Simulation: Dynamic system modelling, numerical simulation, engineering data analysis, model validation

Languages

English: Professional proficiency **German:** B2