

# Cornelius Gruss

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## EDUCATION

### Boston University (BU)

Boston, MA

*Master of Science in Robotics & Autonomous Systems; GPA: 3.93/4.0*

*Expected May 2026*

- Coursework: Deep Learning, Robotics & Autonomous Systems, Embedded Systems, Dynamics Modeling, Optimal & Robust Control, Vision/Robotics/Planning (Spring 2026)

### Technical University of Munich (TUM)

Munich, Germany

*Bachelor of Science in Mechanical Engineering; Thesis Grade: 1.0/1.0 (4.0/4.0 US equiv.)*

*Sep 2021 – May 2025*

- Coursework: Automatic Control, Engineering Mechanics, Machine Elements, Additive Manufacturing

## RESEARCH & PROJECTS

### Diffusion Policy for Dexterous Manipulation with Proprioceptive Sensing

Spring 2026

*Boston University – ME740 Vision, Robotics, and Planning*

- Designed instrumented glove capturing 15D observations (6DoF wrist pose, 4 joint angles, fingertip forces via 3D Hall sensors, stereo vision) to enable policy learning over diverse grasp types, extending UMI's 8D gripper-width representation
- Built end-to-end demonstration-learning pipeline: custom STM32 DAQ PCB, hardware-triggered stereo cameras at 30Hz, offline visual-inertial pose estimation (CoTracker + GTSAM), and dataset curation with quality auto-gating
- Training diffusion policy (Chi et al.) with dual ResNet18 visual encoders for stereo input and 13D action space (relative SE(3) + joint angles)

### Vertical Robot Dynamics Modeling & Control

Fall 2025

*Boston University – Dynamics Modeling*

- Derived equations of motion using Lagrangian mechanics for differential drive robot on vertical surfaces
- Implemented computed torque (PD+) controller with gravity compensation, achieving <5cm tracking error
- Validated dynamics model through energy conservation analysis (<2μJ drift)

### Reinforcement Learning for Manufacturing Optimization

Nov 2024 – June 2025

*Bachelor's Thesis – Technical University of Munich*

- Developed RL framework integrating AI agents with professional CAM software (hyperMILL) through API integration, achieving 24% faster convergence and 100% job completion rate
- Implemented and compared PPO vs SAC algorithms using Python, TensorFlow, and PyTorch for automated manufacturing parameter optimization

### Aeolos Autonomous Drone Delivery System

Feb 2019 – June 2021

*Independent Development Project*

- Designed and built autonomous delivery drone with custom winch-based payload system, manufacturing components using self-built CNC machine and 3D printers
- Integrated Pixhawk flight controller, GPS navigation, and custom sensor suite into complete autonomous system

## PROFESSIONAL EXPERIENCE

### Cargokite

Munich, Germany

*Technical Development Intern*

*Oct – Dec 2023*

- Designed and prototyped mechanical components for autonomous kite system using SolidWorks; developed test procedures and troubleshoot sensor integration in field conditions

### ORDA Technologies

Munich, Germany

*Software Developer*

*Mar – Oct 2021*

- Developed full-stack features for production applications using JavaScript and AWS; led UI/UX redesign across product suite

### Wingcopter

Weiterstadt, Germany

*Production Intern*

*Aug – Oct 2020*

- Assembled and tested 20+ drone systems (flight controllers, motors, sensors), diagnosing hardware faults including electrical shorts and sensor malfunctions

## TECHNICAL SKILLS

**Programming:** Python, C++, JavaScript, MATLAB · **ML/AI:** Diffusion Policy, Imitation Learning, Reinforcement Learning, PyTorch, TensorFlow · **Robotics:** MuJoCo, GTSAM, ROS, Linux · **Tools:** Git, SolidWorks, Fusion 360, KiCad

## AWARDS

Entrepreneurs of Tomorrow – 2nd Place (2021) · World Robot Olympiad – German Finalist (2019, 2017) · FIRST Robotics – World Championship (2018)