Christian Muhmann

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Education

10/22-10/24 **MSc Mechatronics and Robotics, with distinction**
GPA: 1.0 of 5.0 ("excellent")
Leibniz University Hannover, Hannover (Germany)
Focus: Robotics, Control, and Computational Methods

10/21-10/24 **MSc Mechanical Engineering, with distinction**
GPA: 1.0 of 5.0 ("excellent")
Leibniz University Hannover, Hannover (Germany)
Focus: Mechatronic Systems, Robotics, Control, and Computational Methods

09/16-03/21 **BEng Mechanical Engineering *Duales Studium* (Dual Study Program), with distinction**
GPA: 1.2 of 5.0 ("excellent")
University of Applied Science Münster, Campus Steinfurt (Germany)

Research Experience

01/24-09/24 **Visiting Graduate Student at University of Toronto**
Supervised by Prof. Dr.-Ing. Jessica Burgner-Kahrs, Continuum Robotics Lab
- Master's thesis: Developed dynamic models for tendon-driven continuum robots (TDCRs) with an arbitrary number of tendons and implemented controllers using a generalized Clarke transformation; validated on a prototype achieving robust trajectory tracking under real-time conditions, leading to a first-author paper submitted to IROS 2025

11/22-11/23 **Graduate Student Research & Research Assistant at Leibniz University Hannover**
Supervised by Prof. Dr.-Ing. Thomas Seel and Dr.-Ing. habil. Hans-Georg Jacob, Institute of Mechatronic Systems
- Student research project: Developed recurrent neural network (RNN) models for system dynamics approximation of a pneumatic snake-like soft robot and integrated them into linear and nonlinear MPC frameworks; enabled accurate closed-loop trajectory tracking with an average error of 1.2° in experiments; published as a co-author in IEEE RA-L

Professional Experience

03/21-09/21 **Engineer for System Development of Electrical/Electronic (E/E) Architecture**
E/E Systems Engineering, Schmitz Cargobull, Münster (Germany)
- Designed and documented E/E components and assemblies for vehicle systems, ensuring system integration and compliance with technical standards; additionally, managed a development project for an electrical signal distribution unit, coordinating cross-functional engineering activities

06/19-03/21 **Work Term in *Duales Studium* (Dual Study Program), Part of Bachelor of Engineering**
Schmitz Cargobull AG, Altenberge and Münster (Germany)
- Supported system design, technical documentation, and cross-functional coordination across R&D, product management, and sourcing departments; contributed to process optimization and supported engineering decisions through cost and value analysis

08/16-06/19 **Apprenticeship as Mechatronics Technician**
Schmitz Cargobull AG, Altenberge (Germany)
- Gained practical experience in prototyping, assembly, wiring, sensor integration, and commissioning of electrical, pneumatic, and hydraulic systems, including basic control systems setup and testing

Awards & Scholarships

01/24-09/24 **Scholarship for International Study** from the Dr. Jürgen and Irmgard Ulderup Foundation, awarded for academic excellence to support studies abroad (5,000 €)

10/22-09/24 **German National Scholarship** (*Deutschlandstipendium*) from the Federal Ministry of Education and Research, awarded for talented and high-achieving students (7,200 €)

10/21-09/22 **Dean's List** from the Leibniz University Hannover, awarded for academic merit

03/20	**Karl-Holstein Award** from the North Westphalia Chamber of Industry and Commerce, awarded in recognition of ranking among the top 25 scorers in vocational training exams in North Westphalia (500 €)
11/19	**State best mechatronics technician in North Rhine-Westphalia** from the South Westphalia Chamber of Commerce and Industry at Hagen, awarded in recognition of ranking among the top scorers in mechatronics technician exams across the state
06/19	***"Die Besten"* Award** from the North Westphalia Chamber of Industry and Commerce, awarded in recognition of achieving the highest graduation grade ("excellent") in the mechatronics technician exam

Publications (submitted and published)

Muhmann, C., Grassmann, R. M., Bartholdt, M., & Burgner-Kahrs, J. (2025). Toward Dynamic Control of Tendon-Driven Continuum Robots using Clarke Transform. *arXiv preprint arXiv:2503.20693*. (submitted to IROS 2025)

Schäfke, H., Habich, T. L., **Muhmann, C.**, Ehlers, S. F., Seel, T., & Schappler, M. (2024). Learning-based Nonlinear Model Predictive Control of Articulated Soft Robots using Recurrent Neural Networks. *IEEE Robotics and Automation Letters.*