



# Aran Mohammad

## Robotics and Machine-Learning Engineer

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### Experience

- Research Associate**, Institute of Mechatronic Systems, Hanover Mar 2021 – Present
- Developed interaction-control and machine-learning methods in MATLAB and Python
  - Authored 5 publications incl. best paper; presented at major conferences (ICRA, IROS)
  - Co-secured project on sensor fusion, time series modeling and control
  - Taught course (150 students) on robotics, vision-based control and machine learning
  - Supervised 23 theses and guided 17 students in research and lecture projects
- Research Intern and Master Student**, IAV GmbH, Gifhorn Mar 2020 – Nov 2020
- Developed emission models via physics-based ML; published in journal and conference
- DAAD-Funded Research Intern**, UNESP, Bauru, Brazil Oct 2019 – Dec 2019
- Analyzed CFRP structures in frequency-domain using MATLAB
- Tutor in Control and Modeling**, Leibniz University Hanover Nov 2014 – Jan 2018
- Co-supervised courses with 50 students on control, kinematics and dynamics

### Projects

- Implemented Robot-Agnostic Communication System** 🌐 [aranmoha/testbench](#)
- Designed communication using EtherCAT and Simulink for modeling and logic design
  - Implemented code base that deployed in 7 cross-industry testbeds
  - Integrated camera, force sensors and IMUs via Python, C++ and ROS
- Developed Contact-Detection and Reaction Framework for Safe Robots** 🌐 [aranmoha/safepr](#)
- Implemented real-time algorithms combining detection, classification and reaction
  - Validated control in software-in-the-loop and real-world tests
  - Combined physical modeling with machine learning in Python for online prediction in MATLAB
  - Extended with domain randomization and domain-adversarial training for sim-to-real transfer
- Co-Designed Teaching Courses for Undergraduate and Graduate Students**
- Implemented inverted-classroom teaching and interactive workshops in 150-student course on robotics and ML
  - Co-guided a 6-student team in lecture projects, including technical supervision and task tracking

### Skills

**Software:** MATLAB/Simulink, Python, C++, ROS, Autodesk Inventor, MS Office, Git, DaVinci Resolve

**Libraries:** scikit-learn, PyTorch, Tensorflow, MuJoCo, OpenCV, SciPy

**Languages:** German, Kurdish, English

### Education

- Dr.-Ing. in Robotics and ML, Leibniz University Hanover Mar 2021 – Present
- M.Sc. in Mechanical Engineering (grade: 1.0, distinction), LUH Oct 2017 – Dec 2020
- B.Sc. in Mechanical Engineering (grade: 2.2), LUH Apr 2014 – Sept 2017
- Engineering and Business Administration, LUH Oct 2012 – Mar 2014

### Achievements

Best-paper award at robotics workshop, M.Sc. with distinction (grade: 1.0), Dean's List honoree

### Selected Publications ([Google Scholar](#))

- [1] A. Mohammad, M. Schappler, T. -L. Habich and T. Ortmaier, "SSafe Collision and Clamping Reaction for Parallel Robots During Human-Robot Collaboration", 2023 IEEE/RSJ IROS, [DOI](#)
- [2] A. Mohammad, M. Schappler and T. Ortmaier, "Towards human-robot collaboration with parallel robots by kinetostatic analysis, impedance control and contact detection", 2023 IEEE ICRA, [DOI](#)
- [3] A. Mohammad, H. Muscheid, M. Schappler and T. Seel, "Quantifying Uncertainties of Contact Classifications in a Human-Robot Collaboration with Parallel Robots", 2023 Human-Friendly Robotics, Springer Proceedings in Advanced Robotics, [DOI](#)