

# Maxim Vochten

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## Experience

### Royal Military Academy

Jan 2025 – Present

Senior Researcher – Robotics & Autonomous Systems unit, Department of Mechanics

Brussels, Belgium

- Leading the team at RMA within the European Defense Funds project GENIUS on robotic demining.

### KU Leuven

Oct 2018 – Dec 2024

Postdoctoral Researcher – Robotics Research Group, Department of Mechanical Engineering

Leuven, Belgium

- Worked on the ERC Advanced Grant ROBOTGENSKILL (2018-2024) focused on generalizing human-demonstrated robot skills. The project was supervised by Prof. Joris De Schutter and was proposed based on the results of my doctoral research.
- Contributed to innovative methodologies for programming robot tasks from human demonstrations by developing novel, generalizable trajectory representations. This research resulted in three articles in top robotics journals.
- Developed software toolboxes implementing our learning framework to further disseminate research results.
- Led the regular project update meetings with the entire team (8-10 people) and created the project website.
- Co-supervisor of two PhD researchers and supervisor of 10+ master thesis students at KU Leuven.
- Coordinated the KU Leuven team (4-5 people) within the Flanders Make ICON project PROROB on programming robot tasks in virtual reality (2021-2022), resulting in a publication at a top conference in automation science.
- Responsible for the allocation of didactic tasks among teaching assistants within the Automation Division of the Department of Mechanical Engineering at KU Leuven (2019-2023).

### KU Leuven

Aug 2013 – Sep 2018

Doctoral Researcher – Robotics Research Group, Department of Mechanical Engineering

Leuven, Belgium

- Researched novel trajectory representations to enable data-efficient learning from demonstration for motion recognition and robot programming, resulting in three publications at the top two conferences in robotics.
- During the summer of 2014, I did a side project on time-optimal motion planning of a fruit picking robot with the Flanders' Mechatronics Technology Centre (FMTC, now part of Flanders Make).
- Supervised three master thesis students. Teaching assistant for the Applied Mechanics 3 course and the Mechanisms and Vibration course in the Mechanical Engineering programme at KU Leuven.

## Education

### KU Leuven

2013 – 2018

Doctor of Engineering Science (PhD) in Mechanical Engineering

Leuven, Belgium

- **PhD thesis:** Invariant representations of rigid-body motion trajectories with application to motion recognition and robot learning by demonstration
- **Elective courses:** Uncertainty in Artificial Intelligence (2013), Winter School on Numerical Optimal Control at the University of Freiburg in Germany (2016)

### KU Leuven

2011 – 2013

Master of Science in Mechanical Engineering – specialization in Mechatronics and Robotics

Leuven, Belgium

- **Master's thesis:** Computer vision-based navigation of a quadrotor using constraint-based control
- **Courses:** Advanced Robot Control Systems, Pattern Recognition & Image Analysis, Optimization of Mechatronic Systems, Systems and Control Theory, Numerical Modeling in Mechanical Engineering

### KU Leuven

2008 – 2011

Bachelor of Science in Mechanical Engineering – with a minor in Computer Science

Leuven, Belgium

## Volunteering

### Sumo Robot Competition

Sep 2014 – Aug 2017

IEEE Student Branch Leuven

Leuven, Belgium

- Organized and presented hands-on workshops for building and programming an autonomous mobile robot from scratch, intended for motivated engineering students as an extracurricular activity during the academic year.
- Organized and presented the yearly Sumo Robot Competition in Leuven in which around 10 teams of students participated each year for a wide public.

## Awards

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### Best paper award 14th International Workshop on Human-Friendly Robotics

Oct 2021

- First author of the winning paper which was on implementing human-robot object handovers using constraint-based programming. The experimental results originated from a master thesis that I supervised.

### Finalist KUKA Innovation Award

Apr 2016

- Participated in an international competition on innovative robotic applications for flexible manufacturing.
- As part of the KU Leuven team, I co-developed an automated kitting system for the automotive industry. A robot was programmed to locate, pick up, and insert work pieces in a tray, while adapting to changes during execution.
- I was mainly responsible for the 3D vision system, which detected and estimated the position of objects on the table and identified human presence. Additionally, I presented and demonstrated the application to the general public and jury throughout the 5-day Hannover Messe event in April 2016.

## Skills

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**Concepts:** Numerical Optimization, Optimal Control, State Estimation, Robot Control, 3D Kinematics, Differential Geometry, Machine Learning, Statistics, Trajectory Analysis, Trajectory Generation, Motion and Path Planning

**Software:** Python, Matlab, C++, Linux, Git, ROS, OROCOS, eTaSL, CasADi

**Hardware:** Robots - KUKA LWR, ABB Yumi, Franka Emika Panda, Universal Robot UR10, KUKA iiwa,  
Sensors - Krypton K600, Microsoft Kinect, HTC Vive, force/torque sensing, laser distance sensing

**Languages:** Dutch (Native), English (Fluent), French (B1 certificate)