

# Sahánd Wagemakers

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I am highly driven, intrinsically motivated and solution-focused. I have a great passion for robotics, specifically autonomous & intelligent systems. Knowledgeable and highly proficient in motion planning, control and software development with an additional background in mechanical engineering. Experienced in working both with simulations and state-of-the-art physical robots, having implemented multiple full robotic solutions with both small and large teams.



## Education

### MSc Cognitive Robotics – Delft University of Technology

GPA: 8.14/10

Present (expected graduation January 2024)

- Thesis subject: *“Controlling nonlinear normal modes of underactuated robotic systems”*
- Specializations: (nonlinear) control, motion planning, (deep) machine learning, computer vision, collaborative robotics, sensor fusion.

### BSc Mechanical Engineering – Delft University of Technology

GPA: 7.2/10

2019-2021

- Thesis subject: *“Improving indoor localisation using a smartphone through online constructed magnetic field maps with Gaussian Processes”* – 8.4/10

## Professional experience

### Robotics intern – Stogl Robotics

Sept 2023- Dec 2023 (40hrs/week)

- Fully designed and developed robot-agnostic, workspace-agnostic and task-agnostic pick-and-place framework in ROS 2, including integration in existing company workflow.
- Implemented and tested framework for variety of tasks and robotic arms.

### Software & Robotics engineer – Project MARCH

Aug 2022- Aug 2023 (50hrs/week)

- Developed & managed full software stack for in-house fully-motorized exoskeleton for paraplegic patients.
- Implemented locomotion algorithms through model predictive control and inverse kinematics
- Developed state estimator of the exoskeleton using encoders, pressure soles and IMUs
- Wrote simulations in Mujoco and tested the software and control on physical exoskeleton.

## Extracurriculars

### Tohoku Engineering Summer Programme (TESP) 2023 – Robotics track

Summer 2023

### European Robotics Forum Hackathon - Autonomous multi-robot barn navigation case

1<sup>st</sup> place

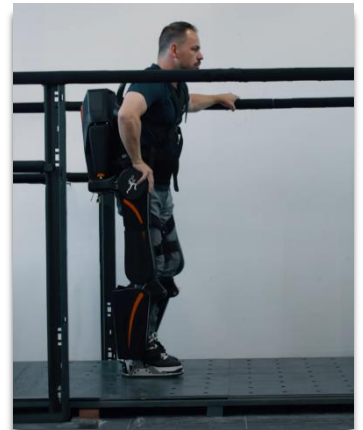
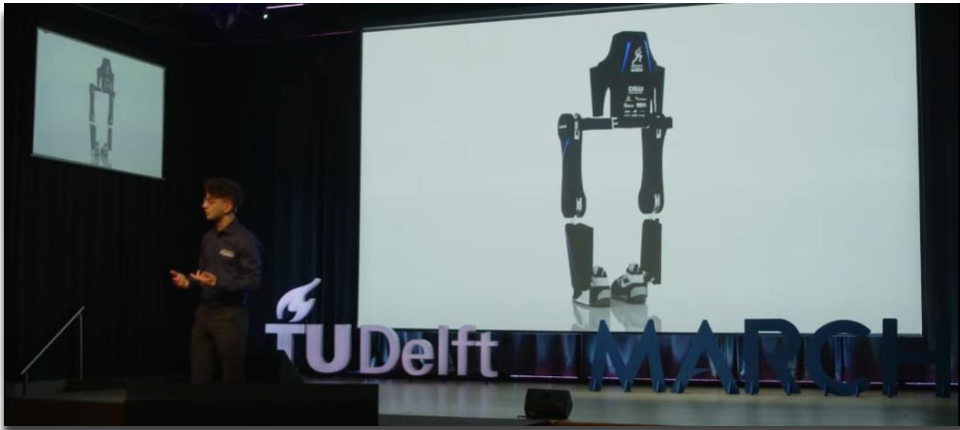
Summer 2022

- Developed the simulation and Lidar object detection algorithm for a cow feed pusher robot in ROS 2.

## Skills

Technical	C++, Python, Matlab, (Nonlinear) control, Motion planning, Machine learning, Simulation (MuJoCo, Gazebo), State estimation, Computer vision, Software development, Git
Professional	Research, Problem solving, Scrum, Collaboration, Presenting
Languages	Dutch (Native), English (Fluent C2, Cambridge certified)

## Relevant projects



### Software & Robotics engineer for Project MARCH

<https://www.projectmarch.nl/march-viii-exoskeleton>

- Full-time student research project, collaborating with a group of 26 multidisciplinary students to develop a fully motorized lower-body exoskeleton to allow paraplegic patients to walk again.
- Was part of a 6-man software & control team, responsible for designing, developing and maintaining the full exoskeleton system.
- Designed and developed the full software architecture, Mainly responsible for motion planning and sensing algorithms necessary for exoskeleton locomotion.
- Implemented a MuJoCo-ROS 2 bridge for plug-and-play testing of locomotion algorithms
- Tested and debugged the robotic solution in both simulations developed in MuJoCo and the physical exoskeleton.
- Received professional training on Scrum, Test-driven development and C++
- Presented the software & locomotion designs in front of an audience of 500 people as speaker of the Design Presentation.

### Controlling nonlinear normal modes of underactuated robotic systems

MSc Thesis

- Delved deep into state-of-the art research on energy-efficient control of nonlinear mechanical systems using Nonlinear normal modes and its application to Continuum soft manipulators, obtaining in-depth knowledge and identifying existing research gaps.
- Developed control algorithms for the control of energy-efficient trajectories for underactuated nonlinear mechanical systems, including formal proofs of stability.
- Developed simulations for elastic-joint manipulators and successfully tested control algorithms.

### Multidisciplinary Project: Indoor robotic barn cleaner through top-view cameras

MSc capstone course

- 3-month project as a team of 5 students to develop the software for a single-sensor(top-view camera) barn cleaning robot.
- Created a full development plan for real stakeholders from project objective to implementation.
- Developed navigation algorithm through dynamic graph generation using a top-view camera and A\* pathfinding. Further improved local dynamic obstacle avoidance through potential field methods.
- **Final grade: 9.7/10.**