John Douglas Clark

MSc Robotics Student · Robot Learning Research

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Work authorization: EU, US, Canada (no sponsorship required)

Profile

MSc Robotics student and student researcher focused on **robot learning, reinforcement learning, and contact-rich manipulation**. Experience developing learning-based robotic policies in **PyTorch and Isaac Lab**, building simulation pipelines, and deploying control and perception systems on physical humanoid hardware. Interested in developing robust manipulation skills that transfer from simulation to real-world robotic systems.

Education

MSc Robotics, *TU Delft* **Delft, Netherlands** *2025 - 06/2027 (expected)*

- **Thesis:** Dynamic Feasibility of Embodiment-Agnostic World Models for Embodiment-Specific Robots, with an **aerial manipulator** as case study. Supervised by **Sihao Sun** and **Javier Alonso-Mora**.
- Current average: **9/10**; on track for **Cum Laude**.
- **Relevant Coursework:** Deep Reinforcement Learning (**10/10**), Robot Dynamics and Control (**9.5/10**), Machine Learning for Robotics (**9/10**), Robot Software Practicals, Machine Perception, Planning and Decision Making.

BSc Electromechanical Engineering, *KU Leuven* **Leuven, Belgium** *2022 - 2025*

- **Valedictorian**, ranked **1/360**; graduated **Magna Cum Laude** (**83.4%**).
- **Relevant Coursework:** Systems and Control Theory, Design of Industrial Control Systems, Industrial Automation, Data Acquisition, Vision Systems.

Research Experience

Student Researcher, *AMR Lab, TU Delft* **Delft, Netherlands** *09/2026 - present*

- Researching the **dynamic feasibility of learned world models** for aerial manipulation, with a focus on contact-rich manipulation tasks.
- Collecting robotic interaction data and developing learned world models in PyTorch, including JEPA-based architectures, to study learned representations for contact-rich manipulation.
- Developing reproducible simulation and evaluation pipelines in **Newton and MuJoCo** to assess model performance, dynamic feasibility, and sim-to-real transfer on an aerial manipulator.

Projects

MimicVLA – Learning Insertion from Phone Videos *2026*

- Fine-tuned the **SmolVLA** vision-language-action model (**LeRobot**) on 64 demonstrations from iPhone videos of my own hand, tracked with ArUco markers and retargeted to a simulated **Franka Panda** in **MuJoCo** via differential IK.
- Evaluated closed loop on 55 unseen start poses $\times$ 5 seeds with bootstrap intervals: **49%** USB insertion from unseen starts, rising from 16% to 49% as demonstrations grew from 16 to 64. Open-sourced code, dataset and policy.

Vision-Based Robotic Insertion – Intrinsic AI for Industry Challenge *2026*

- Designed the policy pipeline with the team: privileged-state **PPO** experts in **Isaac Lab**, distilled through **imitation learning** into a vision-based policy with a pretrained **DINOv2** encoder.
- Trained the team's multi-camera **perception** model (DINOv3-pretrained ConvNeXt + FPN) for segmentation and keypoints of cables, plugs and ports, reaching **88.5% mIoU** on held-out views.

AgiBot X2 Humanoid – Elderly-Care Assistance, *RoboHack, EPFL* **Lausanne, Switzerland** *05/2026*

- Developed and deployed **whole-body motion and person-tracking behaviours** on the **AgiBot X2 humanoid**, enabling autonomous following and physical assistance for standing up.
- Integrated **perception** and **whole-body control** on the AgiBot X2 humanoid, troubleshooting an early-stage robotics software stack and iteratively testing behaviors on physical hardware.

Deep Reinforcement Learning Library *2026 - present*

- Building a modular **Deep Reinforcement Learning** library from scratch in **PyTorch**, implementing **PPO, SAC, DQN, and Actor–Critic** methods.
- Developing reusable training, evaluation, and logging pipelines and validating implementations across discrete and continuous-control **Gymnasium** environments.

Autonomous Greenhouse Inspection Robot – MIRTE Master Mobile Manipulator *2026*

- Built the **ROS 2** state machine (actions and services) that runs each bed scan on a team-built autonomous mobile manipulator, which maps the greenhouse with **SLAM** and navigates between flower beds with **Nav2**; deployed and tested on the physical robot.
- Owned the perception subsystem: fine-tuned a **YOLOv8** flower and pest detector (**mAP@50 0.92** on held-out images), run live on the robot, and a homography-based projection that places 89% of detections within one cell of ground truth.

Industry Experience

Robotics & Real-Time Systems Intern (part-time), *Keysight* **Rotselaar, Belgium** *07/2024 - 08/2026*

- Developed a **real-time robotic control testbed** based on a ball-balancing platform for the **6G-SANDBOX**, used to evaluate the impact of network latency on closed-loop control performance.
- Investigated **edge-computing and network architectures** and their effect on control latency, responsiveness, and system performance.
- Implemented **ML-based skeletal hand tracking** and developed **C++** interfaces to convert raw hardware signals into usable real-time skeletal data.
- Optimised the software and communication pipeline for **low-latency control**, with real-time data transfer over **UDP**.

Vehicle Dynamics Engineer (part-time), *Formula Electric Belgium* **Leuven, Belgium** *09/2024 - 07/2025*

- Developed and evaluated **torque-vectoring control algorithms** for an electric Formula Student race car using vehicle dynamics models in **MATLAB**.
- Implemented the control logic in **C++** for vehicle testing and analysed on-car data from **ROS bags** using **Foxglove**.

Teaching

Teaching Assistant – Planning & Decision Making, *TU Delft* **Delft, Netherlands** *from 11/2026*

- Selected to support MSc Robotics students in **MDPs, reinforcement learning, planning algorithms, and MPC**.

Student Assistant – Electricity and AC Grids, *KU Leuven* **Leuven, Belgium** *01/2024 - 07/2025*

Skills

- **Programming:** Python, C++, C
- **ML & Robot Learning:** PyTorch, Deep RL (PPO, SAC, DQN), Imitation Learning (Behavioural Cloning), World Models (e.g. JEPA), DINOv2
- **Robotics & Control:** ROS 2, Model Predictive Control (MPC), PID, Planning and Decision Making
- **Simulation:** Isaac Lab / Isaac Sim, MuJoCo, Newton, PyBullet
- **Tools:** Git, Linux, MATLAB, CVXPY/OSQP, Foxglove
- **Experimentation:** Robot Data Collection, Model Evaluation, Experimental Design, Performance Analysis.
- **Soft Skills:** Communication, Teamwork, Problem Solving, Adaptability

Languages & Interests

- **Languages:** English (Native), French (Native), Spanish (Practical Fluency), Dutch (Elementary)
- **Interests:** Brazilian Jiu-Jitsu · Electric Guitar · Hiking (Camino de Santiago, Duke of Edinburgh)