

CLAUDE DANIEL JACQUET

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Summary

Robotics engineer spanning embedded systems, control, motion planning, and robot learning. Purdue M.S. Robotics candidate (4.0 GPA, Dec 2026), with tactile sensing and VLA research at Mars Lab and dual-arm assembly R&D at Magna.

Skills

Languages & Tools: C++, Python, C, MATLAB/Simulink, ARM Assembly, CUDA, Git, Linux, CMake, KiCad, Fusion 360
Simulation & Motion Planning: ROS 2 (ROS2), MoveIt 2, NVIDIA Isaac Sim, MuJoCo, Gazebo, cuRobo, OMPL, Pinocchio, FCL, Trajectory Optimization, Forward Kinematics (FK), Inverse Kinematics (IK), A*, RRT*, Digital Twin
Perception & Estimation: Computer Vision (OpenCV, YOLO, RealSense), Hand-Eye Calibration, Visual Servoing (IBVS/PBVS), SLAM, Sensor Fusion, Extended Kalman Filter (EKF)
Robot Learning: PyTorch, Reinforcement Learning (PPO, RLPD, Residual RL), Imitation Learning, Vision-Language-Action (VLA), Sim-to-Real, Domain Randomization, Teacher-Student Distillation
Hardware & Embedded Systems: UR10e, UR16e, SO-101, LEAP Hand, STM32, ESP32, Raspberry Pi, LiDAR, IMU, Depth & Tactile Sensors, PCB Design, I2C, SPI, UART

Experience

Robotics Research Intern, Advanced Robotics

May 2026 to Aug 2026

Magna International • Isaac Sim, cuRobo, OMPL, PyTorch, LeRobot, Python

Troy, MI

- Built a **CAD-to-learned-insertion pipeline** for dual **UR10e** arms in Isaac Sim: geometric assembly sequencing and **cuRobo/OMPL** motion planning generated assembly plans in **59 s, 4.4x faster** than the previous pipeline.
- Architected a **hybrid classical/learned architecture** combining classical transit planning with contact-rich insertion, using **domain-randomized** demonstrations from **teacher-student privileged experts**.
- Achieved **60% insertion success** with **RLPD** at **9.7 N** median peak force (**about 5x lower force, 6x fewer steps** than the scripted expert).
- Fine-tuned **VLA** models (**pi0.5, SmolVLA**) for 1–2 mm clearance insertions; evaluated **residual RL** over frozen models.
- Teleoperation:** analyzed **force-feedback, gravity-compensated leader-arm** designs.

Graduate Research Assistant, Full-Hand Tactile Manipulation

Jan 2026 to Present

Mars Lab, Purdue University • Python, MuJoCo Playground, LEAP Hand, ROS 2

West Lafayette, IN

- Engineered a **teleoperation pipeline** integrating **Rokoko** motion-capture gloves and **Apple Vision Pro** spatial tracking.
- Researching **tactile sensor encoders** for contact **awareness** and **VLA** integration on the **16-DOF LEAP Hand**.
- Designed **Fusion 360** hardware validation fixtures to characterize multifingered tactile sensors.

Software Developer

Dec 2023 to Dec 2024

ANACAPH, Haiti • Python

Remote

- Maintained platforms for **10,000+ users**; wrote **Python** database migration scripts, cutting deployment time by **80%**.

Projects

Genesis: Custom Dual-Arm Mobile Manipulator, Firmware to Autonomy

Sep 2024 to Present

ROS 2, C++, Python, PyTorch, MuJoCo, Isaac Sim, OMPL, Pinocchio, LeRobot, ESP32, KiCad, Fusion 360

- Hardware & Firmware:** Engineered a **mecanum base**, lift column, and dual **SO-101** arm design in **Fusion 360**; developed **KiCad** PCBs and **ESP32** interfaces linked via **UART** to **ROS 2** on a **Raspberry Pi 5**.
- Whole-Body Motion Planning:** Combined **Pinocchio** kinematics, batched IK, SIMD collision checking, **OMPL** search, and **TOPPRA** retiming to solve dual-arm and base paths in **about 600 ms on CPU**.
- Perception:** Trained keypoint heads on frozen **DINOv3** (ViT-S/16) features using synthetic data for **zero-shot** real-world transfer; used **PnP** for 6-DOF pose estimation and **IBVS/PBVS** visual servoing.
- Autonomy Architecture:** Built a **Behavior Tree** executor for YAML tasks across **MuJoCo, Isaac Sim, Gazebo**, and hardware; testing **EKF SLAM** and **A*/RRT*** base navigation.
- Learned Skills Integration:** Trained **ACT/SmolVLA** behavior-tree policies on planner demos; testing **HIL-SERL**.

Vision-Guided Autonomous Wound Scanning and Treatment

Jan 2026 to Apr 2026

ROS 2, MoveIt 2 (MoveIt2), Python, C++, OpenCV, Gazebo, UR16e • Purdue team project

- Led **ROS 2** architecture, **SVD surface-normal estimation**, and **IK-filtered viewpoint planning**; the **UR16e** system detected **40/56 wound patches** across four physical mannequin-scanning sessions.
- Built **FSM-based pose tracking** with **Pilz PTP** corrections, maintaining a **15 cm standoff** in **Gazebo simulation**.

FastPath: Neural-Accelerated A* Pathfinding

Sep 2025 to Dec 2025

PyTorch, Python, A*, Attention U-Net, CNNs, Path Planning

- Developed a **31.9M-parameter Attention U-Net** with **admissibility-aware loss: 89.7% fewer A* expansions, 0.43% inadmissible cells, and 0.28% path-cost overhead** on **10,000 test maps**.
- Drop-in A* integration:** one forward pass yields a reusable goal-distance map for **O(1)** heuristic lookups and replanning; **4.78x faster search**, approximately **1.5 ms** batched inference per map.

Embedded Framework for Multi-Application Devices

Jun 2025 to Aug 2025

C++, Service-Oriented Architecture, Hardware Abstraction Layer (HAL), Dependency Injection, State Machines, ISRs, BLE HID

- Built a **service-oriented C++ framework** (SOLID, AUTOSAR-inspired) with a polymorphic HAL and hot-swappable app manager, reducing new-application integration time by **90%**.

Education

M.S. Robotics, GPA 4.0

Jan 2025 to Dec 2026 (expected)

Purdue University • Flexible Robotic Assembly, Machine Learning, Machine Vision, Autonomous Systems

West Lafayette, IN

B.S. Electrical Engineering and Control Systems

Sep 2021 to May 2024

University of Toulouse • Embedded Systems, Signal Processing, Control Theory

Toulouse, France