# Jack Leckert

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## PROFILE

French-German Software engineer at Swift Navigation, specialized in Robotics localization, perception and controls.

| RESEARCH INTERESTS | TECHNICAL SKILLS | PROFESSIONAL SKILLS |
|---|---|---|
| Model and learning based controls | Python, C/C++ | French – native language |
| Machine learning | Linux / CLI | German – native language |
| GNSS positioning | Github / CI | English – C1 (TOEFL iBT 93) |
| | AWS, Kubernetes | |

## PROFESSIONAL EXPERIENCE

**Software engineer** JULY 2024 – PRESENT
*Swift Navigation, San Francisco, CA*
Software System engineer as part of the IoT team.
- Proposed, led and built an automated data analysis software to optimize the quality and availability of Swift's base stations network. This effort led to the successful acquisition of 2 new customers.
- Developed a binary protocol converter from Swift Binary Protocol to MCAP protocol to be compatible with various visualization platforms.
- Fine-tuned Starling positioning engine parameters using a genetic algorithm, leading to a 20% increase in 2D position accuracy of Swift's XGPS DashPro.

**Graduate student instructor** AUGUST 2023 – JUNE 2024
*UC Berkeley, CA, USA*
Teaching assistant for the undergraduate class Experimentation and Measurements.
- Preparing and supervising weekly labs of 20+ students, along 2 other GSIs.

**Flight software engineer** FEBRUARY 2023 – JUNE 2023
*Skybase, Christchurch, New Zealand*
Flight software engineer with the mission to develop a vision system for an autonomous retardant airplane.
- Developed automated object detection functions for a remotely piloted flight control system.

**Technology analyst intern** MAY 2022 – OCTOBER 2022
*Starburst Aerospace, Munich, Germany*
Technology analyst intern as part of the Starburst Startup Accelerator in Munich.
- Conducted one major consulting project about hot and harsh environment electronics for a European Tier-2 Aerospace supplier.
- Assessed the technology viability of Aerospace startups and fit for the Starburst community (+300 startups).

## EDUCATION

**Master of Engineering, Robotics** AUGUST 2023 – JUNE 2024
*University of California, Berkeley, USA*
Focus on controls and machine learning. GPA: 3.96/4.00.

**Engineering degree, Robotics & Mechanics** SEPTEMBER 2020 – JUNE 2022
*École Centrale de Lyon, France*
Computer science, machine learning, non-linear automatic control, numerical analysis, mathematics, solid and fluid mechanics, physics, material science, signal processing, electronics. GPA: 3.78/4.00.

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**Preparatory classes for the Grandes Ecoles** SEPTEMBER 2018 – JUNE 2020
*Lycée du Parc, Lyon, France*
Two years of intensive preparatory classes for the French engineering schools nationwide scientific competitive examination (MPSI and PSI*).
Mathematics, physics, mechanics, automatic control, computer science, chemistry.

**High School** SEPTEMBER 2015 – JULY 2018
*Lycée Français Victor Hugo, Frankfurt, Germany*
Scientific Baccalauréat (high school diploma), highest honours.
One trimester of the 10th grade spent at Winnipeg, Canada.

# RESEARCH AND ENGINEERING EXPERIENCE

**UAV research project** SEPTEMBER 2023 – JUNE 2024
*UC Berkeley, Hybrid Robotics lab*
Research project focusing on developing a controller for a flapping wing UAV using model-based control and reinforcement learning. Simulation software used is Mujoco.
- Drone design developed on Solidworks and converted to XML.
- Computation of fluid forces in C++ using aero strip theory (Wagner's model).
- MPC and RL controller developed in Python for the simulation.

**ESA AutoICE challenge** FEBRUARY 2023 – MAY 2023
Deep learning challenge in partnership with DTU to automate sea ice mapping of the Artic using Sentinel-1 SAR imageries.
- Selection of three main parameters to qualify: ice concentration, stage of development and floe size.
- Trained a U-net (contracting and expanding CNN) using parallel cloud computing from Azure.
- By fine-tuning hyperparameters, I reached F1 and R2 scores of about 80%.

**Fluid mechanics research project** SEPTEMBER 2021 – MAY 2022
*École Centrale de Lyon, Fluid Mechanics and Acoustics Laboratory (LMFA)*
Research study focusing on reducing the drag force on a marathon runner by placing partners in a specific formation around him.
- Designed and machined a test bench using CAD and Fusion 360.
- Tested experimentally and analyzed the effects on the drag force when varying parameters (distance and angles) between the runners.
- Designed a formation by iteration allowing to save up to 2min 23s on a full marathon, or 27s less than the actual world record from E. Kipchoge during the INEOS 1:59 Challenge in 2019.

A research paper has been published in the Proceedings of the Royal Society A.

**Aerospace engineering project** SEPTEMBER 2020 – JUNE 2021
*École Centrale de Lyon, Fluid Mechanics and Acoustics Laboratory (LMFA)*
Building of a supersonic rocket (the Centrale Transonic Rocket) with a team of 5 students as part of the national competition C'Space organised by Planète Sciences.
- Designed and built an electronic acquisition chain to save pressure data using C++.
- CAD designed and 3D-printed a rocket cone.

# VOLUNTEERING AND ASSOCIATIVE EXPERIENCE

**President of a student organization** OCTOBER 2020 – FEBRUARY 2022
*Centrale Lyon Conseil, Lyon, France*
Centrale Lyon Conseil is the Junior-Enterprise of École Centrale de Lyon, the analogue of a consulting club. Students apply their theoretical and practical skills to carry out projects in various engineering fields and work for a wide range of companies: startups, small or big enterprises and communities.
- Managed a team of 24 students in order to reach the goals of the strategy.
- Managed around 15 customer projects, including websites, engineering projects and market studies, resulting in a 150% increase in sales.