

# Jack Leckert

🏠 San Francisco, CA, United States  
✉ [jack\\_leckert@berkeley.edu](mailto:jack_leckert@berkeley.edu)  
☎ +15103658297 (US) | +33635635705 (WhatsApp)  
🌐 [www.linkedin.com/in/jack-leckert](https://www.linkedin.com/in/jack-leckert) | <https://jackleckert.github.io> | [github.com/jackleckert](https://github.com/jackleckert)

## 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 Machine learning GNSS positioning	Python, C/C++, SQL Linux / CLI Github / CI AWS, Kubernetes	French – native language German – native language English – C1 (TOEFL iBT 93)

## PROFESSIONAL EXPERIENCE

- Software engineer**JULY 2024 – PRESENT  
*Swift Navigation, San Francisco, CA*  
Software 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.
  - Designed and built a suite of customer-facing REST APIs for real-time service indicators (geofencing, coverage).
  - Fine-tuned Starling positioning engine parameters using a genetic algorithm, leading to a 20% increase in 2D position accuracy of Swift's XGPS DashPro.
  - Developed various protocol converter for data processing and visualization.
- 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.

**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 10<sup>th</sup> grade spent at Winnipeg, Canada.

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## 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 Arctic 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.
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## 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.