

# MARC ANDRÉ LEROY

Robotics Engineer – Microengineering EPFL Graduate

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## SUMMARY

Having had a **multidisciplinary** engineering education, my curiosity is attracted by the fields of **robotics**, **control systems** and **aerospace**. I am an open-minded person with **international** experience and my **language skills** suggest assignments in a multinational environment.

## WORK EXPERIENCE

### Pix4D S.A.

Lausanne, Switzerland

*Senior IoT Engineer (initially Hardware Engineer)*

01/2018 – Present

Within the Crane Camera Team I develop a solution of distributed, yet synchronized **IoT cameras** for daily construction site mapping. The results are used by BIM / Construction Site Managers to support them in their critical decisions.

At the time I joined the company, our division was very small (5 people), so a **variety of tasks** was asked of me while the product was evolving and the business was growing.

In particular my work involved **sensor integration** (IMU, GPS, camera, etc.) and **fusion** for **state estimation** using a variety of programming languages (Python, C/C++), **mechanical design** (Autodesk Inventor), **PCB development/verification** (KiCAD), as well as other tasks when required, such as **product manufacturing**, **workshop** and **stock levels management**, **business development** and **pre-sales / customer support** thanks to my language skills.

All this led to a successful product, being increasingly adopted by major companies in the construction industry. Our team has since then doubled, and I have been able to devote myself solely to R&D tasks.

Currently my focus is on improving the state estimation algorithms I implemented, by making sure the system provides accurate, noise-rejecting data, even with its low-cost sensors in order to keep the manufacturing cost of the product within its budget.

Furthermore, I've led the international certification effort of our product, and achieved approval for different markets, namely **CE/RED** (EN 301 489, EN 301 908-1, EN 303 413, EN 62311, EN 62368-1, EN 60950-22, EN 60529), **FCC/ISED** (radio and EMC §15B + ICES-003) and **KC**.

### NASA Ames Research Center

Mountain View, United States of America

*Research Scholar*

02/2017 – 08/2017

I worked in the Dynamic Tensegrity Robotics Lab within the Intelligent Robotics Group to develop **novel locomotion control algorithms**, as well as support the **manufacturing and testing of a tensegrity robot** that will be used in future NASA missions.

I presented my work at the Structurally Adaptive Tensegrity Robots workshop (07/2017) during the NASA/ESA Conference on Adaptive Hardware and Systems held at the Pasadena California Institute of Technology.

### Universo S.A. – Swatch Group

La Chaux-de-Fonds, Switzerland

*Warehouseman*

07/2014 – 07/2014

I did an internship in the general mechanics workshop of the company; I used a Numerical Control Machine, lathes, mills and drills, and repaired small mechanical pieces.

### Swiss Armed Forces Command Support Organization

Jassbach and Zimmerwald, Switzerland

*Private First Class Strategic Radio Explorer*

10/2011 – 08/2012

I did my full military obligations as a Swiss citizen in the Center of Electronic Operations, where I was working with classified equipment. I also instructed new and returning privates how to use the equipment.

## EDUCATION

### Ecole Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

*MSc in Microengineering*

09/2015 – 09/2017

Major in Robotics and Autonomous Systems, minor in Space Technologies

### Ecole Polytechnique Fédérale de Lausanne (EPFL)

Lausanne, Switzerland

*BSc in Microengineering*

09/2012 – 07/2015

Focus on Systems and Control, Manufacturing Engineering, Electronics and Photonics

## SKILLS

- **Robotics:** Systems Engineering, Mechanical Design, Kinematics, Dynamics, Actuators, Sensors, Microcontrollers, Electronics, Signal Processing, Image Processing, Computer Vision, Sensor Fusion, Control, State Estimation, Localization, Navigation, Locomotion, Haptic Interfaces, Machine Learning
- **Control Systems:** Linear, Nonlinear, Model Predictive, Central Pattern Generators
- **Computer-Aided Design and Manufacturing:** SolidWorks, Autodesk Inventor, CATIA, Fusion 360, KiCAD, 3D printing
- **Programming and Scripting:** Python, C, C++, Matlab, Simulink, Simscape, Bash, OpenCV, LabVIEW (Certified Associate Developer in 2015), Modelica, Assembly, JavaScript
- **Productivity:** Git, LaTeX, Microsoft Office Tools (Excel, PowerPoint, Word)

## PROJECTS

- **Master's thesis:** *Manufacturing, Control and Testing of a Tensegrity Robot for Planetary Landing and Exploration* – My Master's thesis was a collaboration between **NASA Ames Research Center** and EPFL's **Biorobotics Laboratory**. The innovative results of my work were also presented in a conference and in public outreach activities throughout my time at NASA Ames Research Center
- **Semester projects at EPFL:**
  - *CleanSpace One capture system dynamics and design* – I performed reliability simulations to optimize the shape of a satellite's subsystem. My work was included in a publication I co-authored presented at the 2017 International Astronautical Congress in Adelaide, Australia
  - *Model of energetic cost against rough terrain and perturbations* – I conducted a study on how the energy consumption of a biologically inspired exoskeleton could be reduced
  - *Design of an adaptive structure for multirotors to transport packages of different sizes* – I designed and manufactured a modular drone structure that can fit different packages

## LANGUAGES

- **French:** Native language
- **Portuguese:** Native language
- **English:** Native language
- **German:** Advanced (C1)
- **Spanish:** Intermediate (B1)

## EXTRA-CURRICULAR ACTIVITIES

- I was a selected participant in two space engineering international workshops:
  - One in 09/2016 for 25 students at the Swiss Space Center where I built a ground station to receive satellite signals
  - One in 07/2016 for 60 students at Bauman Moscow State Technical University in Moscow, Russian Federation, where I was the *Robotics Group Leader* (8 people) in the Group Project
- From 09/2014 to 12/2016, I was a part-time **Teaching Assistant** at EPFL in multiple courses taught in French or English for 1<sup>st</sup> and 2<sup>nd</sup> year Bachelor students
- I was a member of different **Student Associations** throughout my education:
  - *MSc in Microengineering Students' representative* (09/2016 – 09/2017) – mediator between the 147 students, the Professors and the Direction
  - *Treasurer for "Dynamic"* (05/2015 – 06/2016) – annual budget management
  - *Staff Manager at the "LudIC" event* (05/2013 – 06/2016) – from 05/2013 to 06/2016, I leaded teams of approximately 20 volunteers during the biannual "LudIC" events at EPFL
  - *Member of the "Coaching EPFL"* (09/2013 – 07/2014) – coach for 15 1<sup>st</sup> year BSc students
- Sports: Windsurfing, Tennis, Cuban Salsa dance
- Music player (drums)

## PERSONAL INFORMATION

30 years old – Married – Swiss and Brazilian dual citizenship – All military obligations already fulfilled