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 – 03/2024
Within the Crane Camera Team I developed 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 then doubled, and I could devote myself solely to R&D tasks, specifically 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**.
From Q3 2023 onward, my focus was on a different product, where I was the **sole firmware engineer** (BLE, I²C, USB, etc.) of a cell phone accessory, again enabling reliable inputs for a photogrammetry pipeline.

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
Internship using a Numerical Control Machine, lathes, mills and drills to manufacture and repair components.

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, Linux, Communication Protocols (e.g. Bluetooth Low Energy, TCP, UDP, USB, I^2C, SPI, UART, GPIO), Microcontrollers (e.g. ESP32, RP2040, Arduino, FreeRTOS), Single-board Computers (e.g. BeagleBone, Raspberry Pi), Electronics, Signal Processing, Image Processing, Computer Vision, Sensor Fusion, Control, State Estimation, Localization, Navigation, Locomotion, Haptic Interfaces, Machine Learning, Reinforcement 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++, Bash, OpenCV, Matlab, Simulink, Simscape, LabVIEW (Certified Associate Developer in 2015), Modelica, Assembly
- **Productivity:** Git, Unit Testing, Docker, 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)

ADDITIONAL 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 1st and 2nd 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 1st year BSc students
- Sports: Windsurfing, Tennis, Cuban Salsa dance
- Music player (drums)

PERSONAL INFORMATION

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

Last updated on Mar. 20th 2024