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

- Developed a solution of distributed, yet synchronized **IoT cameras** for daily construction site mapping, aiding BIM / Construction Site Managers in critical decision-making
- Worked in a small team of 5, handling **diverse tasks** as the product evolved and the business grew (and eventually the team)
- **Integrated** and **fused sensors** (e.g. IMU, GNSS, camera) for **state estimation** using C/C++/Python
- Conducted **mechanical design** using Autodesk Inventor and **PCB development/verification** with KiCAD
- Managed **product manufacturing**, **workshop** and **stock levels**, **business development**, and **pre-sales / customer support** leveraging **language skills**
- With the team growing, focused on **R&D**, improving state estimation algorithms to provide accurate, noise-rejecting data with low-cost sensors to keep the manufacturing cost of the product within its budget
- **Mentored** a graduate student intern in developing an **edge AI algorithm** (TensorFlow Lite) for image quality assessment and data throughput optimization
- Led international certification efforts, achieving approvals 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**
- **Sole embedded software / firmware engineer** (RTOS, BLE, I²C, USB, FUOTA, etc.) of multiple cell phone accessories, enabling reliable inputs for a photogrammetry pipeline

NASA Ames Research Center Mountain View, United States of America
Research Scholar 02/2017 – 08/2017

- Developed **novel locomotion control algorithms** in the Dynamic Tensegrity Robotics Lab within the Intelligent Robotics Group
- Supported the **manufacturing and testing of a tensegrity robot** that will be used in future NASA missions
- Presented 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

- Completed an internship utilizing Numerical Control (NC) machines, lathes, mills, and drills
- Manufactured and repaired components using various machining tools

Swiss Armed Forces Command Support Organization Jassbach and Zimmerwald, Switzerland
Private First Class Strategic Radio Explorer 10/2011 – 08/2012

- Fulfilled full military obligations as a Swiss citizen in the Center of Electronic Operations
- Worked with classified equipment
- Instructed new and returning privates on the use of 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, AVR, Nordic, Zephyr, FreeRTOS, RP2040, Arduino, over-the-air firmware updates), Single-board Computers (e.g. BeagleBone, Raspberry Pi, NVIDIA Jetson Nano), Electronics, Signal/Image Processing, Computer Vision, Sensor Fusion, Control, State Estimation, Localization, Navigation, Locomotion, Manipulation, Haptic Interfaces, Machine Learning, Reinforcement Learning
- **Control Systems:** Linear, Nonlinear, Optimal, Adaptive, Model Predictive, Central Pattern Generators
- **Computer-Aided Design and Manufacturing:** SolidWorks, Autodesk Inventor, CATIA, Fusion 360, KiCAD, 3D printing, Soldering
- **Programming and Scripting:** C, C++, Python, Bash, OpenCV, TensorFlow Lite, Matlab, Simulink, Simscape, LabVIEW, Modelica, Assembly
- **Productivity:** Git, Unit Testing, Docker, LaTeX, Microsoft Office Tools (Excel, PowerPoint, Word)

ACADEMIC 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:**
  - *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

- Selected participant in two space engineering international workshops:
  - Swiss Space Center (09/2016): built a ground station to receive satellite signals
  - Bauman Moscow State Technical University (07/2016): *Robotics Group Leader* for a team of 8 students
- Part-time **Teaching Assistant** at EPFL (09/2014 – 12/2016) in multiple courses taught in French or English for 1st and 2nd year Bachelor students
- Member of various **student associations** throughout my education:
  - *MSc in Microengineering Students' representative (09/2016 – 09/2017)*
  - *Treasurer for "Dynamic" (05/2015 – 06/2016)*
  - *Staff Manager at the "LudIC" events (05/2013 – 06/2016)*
- Hobbies: Tennis, Cuban Salsa dance, Windsurfing, music player (drums)

PERSONAL INFORMATION

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

Last updated on July 17th 2024