



## Federico Pratissoli

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Born 17 March 1994

### WORK EXPERIENCE

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October 2015 – October 2015

#### Volunteer

EXPO Milan, Milan, Italy

- The assigned task was to welcome the Italian and foreign tourists that were visiting the exposition and to guide them to the interested pavilions. Abilities to adapt and to relate with other people have been improved in a multicultural environment.

July 2016 – early November  
2016

#### Intern

HySyDe - Dismi - Unimore, Reggio Emilia, Italy

- During this internship, the dissertation for the Bachelor's degree has been written, which topic is about the analysis and simulation of the **hydraulic circuit** of an automotive power transmission system, in particular a **dual clutch transmission (DCT)** system, for high specific power vehicles. Different knowledge have been developed such as CAD design, analysis, design and simulations of hydraulic circuits, and analysis, considering all the components, of a DCT transmission system.

July 2018 – early December  
2018

#### Intern

ACSE Department, University of Sheffield, Sheffield, UK

- During the internship, knowledge about Swarm Robotics, **Soft Robotics** and control of **multi-robot systems** have been developed. The aim of the project was the realization of a soft-bodied modular reconfigurable robotic system built by interconnecting a large number of small and simple robots through an elastic material. The control of the system is based on **distributed control algorithms**, designed applying the properties studied in the context of swarm intelligence. A journal paper was written and submitted about this project.

February 2019 – Present

#### Research fellow

ARS Control - Dismi - Unimore, Reggio Emilia, Italy

- The project is about the control of **multi-robot systems** and **mobile robots**. The main objective is realization and experimentation, in collaboration with the company "Proxaut srl", of a software capable to manage the **traffic** of a high number of **AGVs** in a completely automated warehouse or factory. The full system is analysed as a **graph** network and the algorithms are written in python.

### EDUCATION

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2016 – February 2019

#### Master's degree in Mechatronics Engineering

Department of Sciences and Methods for Engineering, Università degli Studi di Modena e Reggio Emilia, Reggio Emilia, Italy

- Grade: **110/110 summa cum Laude**.
- Knowledge about control of **industrial robots**, digital and analog electronics, **digital control** and **control of automatic machines** have been developed. Studies of hydraulic systems design modeling and simulation and FPGA systems have been taken.
- Deep knowledge about **embedded systems** design, micro-controllers programming, **CAN and RS232 communication protocol** have been acquired.

## 2013 – 2016 Bachelor's degree in Mechatronics Engineering

Department of Sciences and Methods for Engineering, Università degli Studi di Modena e Reggio Emilia, Reggio Emilia, Italy

- Grade: **110/110 summa cum Laude**.
- Knowledge about structural mechanics, **hydraulic systems**, electronic circuits, automatic controls, electric machines CAD and FEM designing have been developed.

### SKILLS

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Languages **Italian** language – native language

**English** language – Studied during the Scientific High School, improved thanks to the English language courses followed during the master's degree, and experienced during the internship period at The University of Sheffield, in UK. English level is C1 **advanced** according to Common European Framework of Reference (CEFR) verified through the EF SET test.

General skills **Windows** operating system, **Linux** operating system

#### *Programming skills*

- Lua(V-Rep), **C**, C++(QtCreator), **Python** languages
- OpenModelica programming environment:  
a library of hydraulic components was realized and then tested in the open-source programming environment OpenModelica
- Micro-controller programming:  
An embedded system was realized with the aim to implement the control through multiple micro-controllers communicating via **CAN** and an FPGA connected via **RS232**. (Mplab IDE)
- FPGA device programming in VHDL language. (Quartus II, Altera, software)
- BECKHOFF TwinCAT, structured and ladder diagram languages:  
A course related to the control of automatic machines and **PLC** programming, in collaboration with Tetra Pak, was followed and a final project was accomplished. The task was to program a palletizer simulated on industrialPhysics, 3D simulation software.
- **Matlab** and **Simulink**

#### *Computer design and manufacturing*

- Solidworks, CAD and FEM analysis
- Cimatron, CAM software
- Software Lusas, FEM analysis
- Knowledge of AutoCAD and Inventor

#### *Simulation of electrical circuits*

- Software Ltspice
- Software Plecs
- Software Proteus 8 Professional

LMS Imagine.Lab Amesim

LaTeX

Solder circuit boards

- Skill needed in the projects accomplished during the degree.

- Projects** *December 2016 - January 2017*
- **Designing** of an amplifier and its **electric circuit** by using LTspice simulator, in which the final aim was maximize the efficiency and minimize the distortion.
- June 2017 - July 2017*
- For a company the stress and the strain of a MTB hydraulic disc brake have been studied and a geometric optimization of the disc has been investigated with the aim to minimize the weight of the device. At the same time a **CAM/CAD software** was used to program the manufacturing process of the designed disc brake.
- May 2017 - June 2017*
- A boost converter, a type of DC-to-DC converter, voltage elevator, has been designed and investigated through the **software PLECS**.
- April 2018 - June 2018*
- A model of a fully automatic and smart railway was designed and implemented. The structural part of the model was realized by using LEGOs, the control part was implemented using **multiple micro-controllers** PIC18 communicating via CAN bus, and **FPGA** communicating with the micro-controllers via serial communication RS232.

## ADDITIONAL INFORMATION

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- Honours and awards** April 2017
- Award and first part of the **scholarship "Franco Lombardini"**, reserved to a deserving student holding the mechatronics engineering bachelor's degree and enrolled to the master's degree of the same faculty, in collaboration with the Rotary Club of Reggio Emilia.
- April 2018
- Award and second part of the **scholarship "Franco Lombardini"**, reserved to a deserving student who completed the first year of the master's degree, in collaboration with the Rotary Club of Reggio Emilia.
- July 2018
- Scholarship for the European Traineeship within the Erasmus+ Placement Programme
- Publications** F. Pratissoli, A. Reina, Y. Lopes, L. Sabattini, R. Groß. The Kilobot Soft Robot: A Soft-Bodied Modular Reconfigurable Robotic System. *International Journal of Robotics Research, under review, 2019.*
- F. Pratissoli, A. Reina, Y. Lopes, L. Sabattini, R. Groß. A Soft-Bodied Modular Reconfigurable Robotic System composed of Interconnected Kilobots. *International Symposium on Multi-Robot and Multi-Agent Systems, under review, 2019.*
- Driving licence** Italian Licence - B
- Interests and Hobbies** *January 2019 - present:* I have helped for the creation of a civic list on the occasion of the municipal election and I'm actively participating in the election campaign.
- Lifeguards licence FIN has been obtained in 2012.
- Climbing (Club Alpino Italiano, CAI, member), swimming, skiing, snowboarding, wind-surfing, volleyball.