

# EMANUELE ALFANO

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## Contacts

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Bird: 31/07/1997 a: Rome  
Resident: Rome  
Nationality: Italian  
License: A2 automatic e B

## Professional summary

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Hi, my name is Emanuele Alfano.

I am a computer/automatic engineer specialized in the development of low-level codes and in the development of linear and non-linear mathematical models to be tested on software such as Matlab and Mathematica.

In my academic training I achieved various results, among which the most important one was to participate and win the "Robocup Soccer League Junior" World Cup as software developer of the team.

I have accumulated academic and practical experience for almost 10 years now, and I can summarize my main skills in the list:

- C/C++, Arduino platform, STM32, Raspberry pi, Platform IO, etc...
- TCP/UDT, RS232/RS422/RS485, SSH, UART, SPI, Modbus, I2C, etc...
- PCB design & project with EAGLE
- Matlab, Simulink, Mathematics, mathematical modeling
- Qt5/6, Pandas, Git, Cmake, Qmake
- Python, Java, Bash, zsh, Windows Power Shell
- Linux (User level, Kernel Driver), Real Time OS
- UML, Markdown
- ...

I am open to any interesting and high-tech project that could be an out of the ordinary challenge. My job goal is to perfect my skills while perfecting your products.

I greet you by borrowing the words of *Albert Einstein*: "*I love to travel, but I hate arriving*".

## Skills

### Mathematics

#### Theoretical skills

- Analysis and synthesis of control systems for Linear and Non-Linear systems (Linearization Feedback, I&I, Forwarding and Back Stepping, etc ...)
- Creation of Observers, Linear (Luenberger / **Kalman**) and Non-Linear (High Gain Observers)
- Ability to analyze and design Robust and / or adaptive controls
- Mathematical modeling of mechanical systems in non-linear functions
- State space dynamics for non-Cartesian robots, by **Denavit Hartenberg**
- Non-linear optimization techniques, **Reinforcement Learning**
- **Problem Solving & Problem Finding**

#### Development software

- |                                 |          |
|---------------------------------|----------|
| • MATLAB (Coding & Compiling)   | Expert   |
| • Simulink (Coding & Compilong) | Expert   |
| • Matematica                    | Expert   |
| • Maxima                        | Advanced |

### Software

#### Theoretical skills

- Design and development of Algorithms
- Design of communication protocols
  - Mavlink
  - Ros2
  - Custom
- Intermediate knowledge in **Cyber-security** and execution of intermediate **Penetration-Test**.

#### Programming Language

- |                            |                  |
|----------------------------|------------------|
| • C/C++                    | Extremely Expert |
| • Qt5 & Qt6                | Advanced         |
| • Java, Processing         | Extremely Expert |
| • Python 2, Python 3       | High Advanced    |
| • Assembly                 | Intermedio       |
| • Tomcat, HTML, PHP        | Intermedio       |
| • Bash                     | Extremely Expert |
| • Windows Power Shell      | Advanced         |
| • SQL                      | Intermediate     |
| • Salesforce Apex/Aura/LWC | Advanced         |

#### System & Toolchain

- |  |                  |
|--|------------------|
| • Conan (packet manager for binary compile in C/C++) | Extremely Expert |
| • Cmake  | Extremely Expert |
| • Qmake (punto a sostituirlo con Cmake)              | Expert           |
| • Distributed version control                        | Expert           |
| ◦ Git  | Extremely Expert |
| ◦ Git-Hub/Git-Lab                                    | Expert           |
| • MariaDB  | Intermediate     |

- Developer Software
  - Suite: JetBrains
    - Clion Expert
    - Pycharm Extremely Expert
    - IntelliJ IDEA Extremely Expert
    - PHPstorm Expert
  - QtCreator Advanced
  - Eclipse Advanced
- Simens :
  - TIA portal (PLC) Advanced
  - WinCC\_AO Intermediate
- Atlassian:
  - Bitbucket Advanced
  - Bamboo Advanced
  - Jira Intermediate
  - Confluence Advanced

## OS

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- Windows (uso, API del Kernel) Advanced
- Linux (uso, API, Kernel) Extremely Expert
- Amministratore di Server Linux Advanced
- Linux OS:
  - Ubuntu Extremely Expert
  - Red Hat Enterprise Linux Expert
  - Centos Extremely Expert
  - Mint Expert
  - RaspianOS Expert
- RTOS:
  - Free RTOS Intermediate
  - VxWorks Theoretical
  - LynuxWorks LynxOS Embedded Theoretical
  - Sistema BareMetal (Custom solution) Intermediate

## Debuging Tool

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- GDB, LDD, etc... Expert
- Valgrind Advanced
- WireShark Intermediate

## Protocols

### Networking - Communication

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- TCP/UDT IP Theoretical and Practice
- Ethernet/Wifi Theoretical
- OSI Stack Theoretical
- RS232/RS422/RS485 Theoretical

### Networking - Protocol

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- SSH/SSL/TSL Theoretical and Practice
- IPsec Theoretical
- Uart/USart Theoretical and Practice
- SPI Theoretical and Practice

• Modbus	Theoretical and Practice
• I <sup>2</sup> C	Theoretical and Practice
• HTTP/HTTPS	Theoretical and Practice
• HandShake	Theoretical and Practice
• FTP/SFTP	Theoretical and Practice

## Documentation tools

### Formal languages

• UML	Expert
• E-R Model	Base

### Software di documentazione

• Visual Paradigm	Expert
• Word, Power Point, Excel	Expert
• MarkDown (Git documentation method)	Expert

## Hardware Developer

### Theoretical skills

- Profitable consultation of datasheets and technical documentation
- Digital & Analog Electronics
- Firmware development for custom embedded boards

### Chip family

• Atmel	Extremely Expert
• Microchip	Advanced
• ARM	Intermediate
• FPGA	Theoretical

### Project Skills

• Electronic Schematics drawing	Extremely Expert
• PCB design	Extremely Expert
• Management of PCB production through services 3°	
• VERILOG	Theoretical

### Uso di Software di Sviluppo

• Autocad Eagle	Extremely Expert
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### Manual Skills

• Solder PCB Boards & PrototypesBoard	Extremely Expert
• Creation of Prototypes	

## Meccaniche

### Design tools

- |                      |                  |
|----------------------|------------------|
| • Autocad Inventor   | Extremely Expert |
| • Autocad Mechanical | Extremely Expert |
| • SolidWorks         | Advanced         |

### Instrumentation used

- |              |                  |
|--------------|------------------|
| • Laser cut  | Extremely Expert |
| • CNC        | Advanced         |
| ○ CamBam     | Advanced         |
| ○ G-code     | Intermedio       |
| ○ Mach3      | Expert           |
| • 3D Printer | Expert           |
| ○ Cura       | Expert           |
| ○ Slicer     | Intermedio       |

## Office Automation

- |           |                     |
|-----------|---------------------|
| • Outlook | Advanced            |
| • Excel   | Advanced            |
| • Word    | Molto Advanced      |
| • Latex   | Intermedio-Advanced |

## Professional experiences

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### **Sviluppatore Salesforce**

7/2022 A Oggi

[Enel](#) – Roma, Lazio

With the role of Salesforce Developer, I mainly deal with back-end and partly front-end developments.

In addition to my main role, I maintain and develop the CI/CD Pipeline built in BitBuket+Bamboo (Atlassian suite) using Python+Bash scripts.

### **PLC programmer**

1/2022 A 4/2022

[Automate](#) – Roma, Lazio

In the role of Automation Engineer, I was part of the team that cooperated with Leonardo for the creation of software to be implemented in the PLCs of Zurich airport for the handling of goods and baggage. During my time here I used my IT knowledge to improve the code writing processes within the company, automating the writing of code and creating automatisms to obtain the PLC code from the Leonardo documentation automatically.

### **C ++ Software Developer**

11/2021 A 1/2022

[Rina](#) – Roma, Lazio

As a software consultant, I worked at the "Elettronica Elt" company to the design and development of libraries and applications for managing information from sensors such as Radar.

During the period of work I contributed to revolutionize the method of management, compilation, recovery and linking of the compiled code in the HMI Team's tracks. Obtaining as a result an automation and acceleration of project development by simplifying the work of developers and favoring the Hiding principle in Software development.

### **Tokamak Reactor Simulator Fellow**

7/2021 A 10/2021

Winner of a scholarship for the development of the acquisition and control board of a nuclear reactor simulator based on tokamak physics model, the project was developed under the guidance of professor Daniele Canevale.

### **HW consultant and SW developer for IoT board**

12/2020 A Oggi

[Link](#) – Roma, Lazio

Development of a control board for an air sanitizer based on H<sub>2</sub>O<sub>2</sub> technology, the system allows you to sanitize a large closed environment while maintaining a legal H<sub>2</sub>O<sub>2</sub> threshold

### **Teacher of the Coding-Girl project at its 9th Edition**

1/2021 A 3/2021

**Tor Vergata & Fondazione mondo digitale** – Roma, Lazio

Teaching project for high school girls and boys, aimed at teaching techniques and methods need to creating a website using plug-ins based on AI technologies, the main purpose of the course is to break down gender differences and increase gender equality in STEAM subjects.

### **Winner of the call for tutoring as Assistant of Fundamentals of Computer Science**

9/2020 A 2/2021

Winner of the call as assistant to the Professor of Fundamentals of Computer Science, addressed to students of Internet and Electronics engineering, tutoring aimed at teaching C programming to the students through classroom exercises

### **Scholarship holder for a Hardware & Software project**

9/2019 A 12/2019

Winner of a scholarship for the development of a control board to Anthropomorphic Robot present in the Automation laboratories of Tor Vergata, with relative firmware and interface library on Linux system. The project was carried out under the guidance of Professor Daniele Canevale

**Hardware Developer**

09/2016 A 06/2017

**Andreoli & CO.** – Roma, Lazio

Development of a control and interfacing board for 4-wire intercom systems, with the purpose to remotize the operation through the GSM network.

## Personal / school projects

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### **Thesis work about Drone with Automatic piloting for Magistrale in Tor Vergata**

2020- 2021

Creation of a control architecture from 0 using ROS2 for automatic control and completion of the tasks of the tender imposed by Leonardo for an Autonomous drone. The drone was built by us students in the automatic laboratory, my role was the SW and Chief Control contact, interfacing with the other members of the group, and organizing the development of the system.

### **Member in the "Formula SAE" team of Tor Vergata**

2017- 2018

Enlisted in the Electronics and Powertrain department of the car, I worked on interfacing the car systems by means of a CAN-BUS.

### **Exhibitor with group project at Maker Faire of Rome 2016 & 2017**

2016 &amp; 2017

Presentation of a digital re-proposal of PacMan in REAL format, it consisted of a 2x2m scoreboard and with 4 ghosts and a robotic and remote-controlled PacMan, with LEDs on the field that turned off when PacMan passed, a great team work developed and improved in the years

[http://explore.makerfairerome.eu/poi/Exhibit\\_1039](http://explore.makerfairerome.eu/poi/Exhibit_1039)

[http://emamaker.altervista.org/2018/01/makerfaire-2017/?doing\\_wp\\_cron=1520199901.8992309570312500000000](http://emamaker.altervista.org/2018/01/makerfaire-2017/?doing_wp_cron=1520199901.8992309570312500000000)

### **Exhibitor with personal project at the Maker Faire of Rome 2015**

2015

Introducing a digital recreation of the darts game with laser pointers and changeable target.

Exhibited together with other projects of the students of my high school and my Robotics group, thanks to our work we won the public award and we brought a 3D printer, the PRUSA I3, to the laboratory.

<http://ed2015.makerfairerome.eu/it/espositori/?ids=631>

### **Exhibitor as Maker at the Maker Faire of Rome 2014**

2014

Presentation of a dress that lit up to the rhythm of music created with technological materials

<http://blog.mondodigitale.org/2014/10/06/maker-fashion-alice-nella-palestra-delle-meraviglie/>

### **Part of the development team of the Robotics Group**

2012-2016

Development project for autonomous robots capable of playing football according to the rules of RoboCup Jr.

A very interesting project that gave me a lot. We played in the Light category, our work allowed us to win:

- 4 years in a row the RomeCup, the national qualifying competition for the world championships
- 3 years we won the Austrian races, where we went as external participants
- 2 Years (2014 - 2015) The World Robotics Championships, first in Brazil and then in China

At this juncture I have always been a software developer and operator of the machines with which we made our components, as well as often also the designer of the same.

I also contributed in a decisive way in the development of the robot electronics, since from the HW choices, the SW would consequently have come

<https://www.italia-news.it/roma-iis-galileo-galilei-vince-i-mondiali-di-robotica-in-cina-11553.html>

### **Realization of a small Snake with Arduino**

2011

Small personal project that using a matrix of RGB LEDs, first created a program layer for managing the "screen" using matrices, and subsequently implemented the game logic.

Both SW and HW completely home-made. It was my first project.



## Volunteer experiences

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### Technical assistant at the Focolare Movement association

2016 - in poi

Assistance and help with activities when needed in the direction of lights, audio and video

### Welding teacher for elementary and middle school children

2015 - 2018

As an activity in the FabLab del Quadraro, we brought welding lessons every month for the youngest at the cost of the materials alone.

The project was a transistor oscillator, mounted in such a way as to have 2 LEDs per diodes, and these LEDs flashed, a wooden plate carved with the FabLab Laser was attached to this card, which depicted a smile, the LEDs were his eyes, and as a whole the face flashed constantly

### Programming teacher for junior high school kids

2014

During a campus of the "Focolare Movement" I was asked to give a workshop on something technological for the children who attended.

Given the ages, but wanting to leave my mark, I had remedied a dozen computers, and with this instruments i taught the various groups of children in a 4h session, repeated for 3 days, how to create a small Arachnoid using Scratch as a program.

It was not the classic course where the professor explains and the students copy, I obviously started to explain the basis of programming and how the commands were given, but the final part of the course left them free to build their own game, and following each guy, I helped them one by one to make their own game.

## Instruction

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### Automation Engineering: 110 cum laude

2019-2021

Tor Vergata – Roma, Lazio

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Training in Linux and Unix Real-Time</li> <li>• Industrial Robotics</li> <li>• Design, implementation and control of an unstable system (Momenum-Reverse Pendulum)</li> <li>• Professional use of Solidworks and 3D CAD</li> <li>• Robust and Adaptive Control</li> </ul> | <ul style="list-style-type: none"> <li>• Non-linear control techniques such as:               <ul style="list-style-type: none"> <li>○ Lyapunov Control Function</li> <li>○ Forwarding</li> <li>○ Back Stepping</li> <li>○ ...</li> </ul> </li> <li>• Excellent control</li> </ul> |
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### English course:

2018-2022

Wall Street English – Roma, Lazio

English language enhancement course, currently at their level 40, theoretically equivalent to a full B1.

### Computer and Automatic Engineering: 110 cum laude

2016-2019

Tor Vergata – Roma, Lazio

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>• Linux and Unix training</li> <li>• Systems technology training</li> <li>• Study program in operating systems design</li> <li>• Laboratory research on analysis and modeling of operational performance</li> <li>• Course of study in data structures</li> <li>• Training in algorithms</li> </ul> | <ul style="list-style-type: none"> <li>• Course in software specifications</li> <li>• Advanced computer courses Emphasis in Automation</li> <li>• Continuous training in programming in various languages</li> <li>• In the top 5 of the class</li> </ul> |
|--|---|

**Electronic and Electrotechnical Expert: 100/100**

2011-2016

- |   |   |
|---|---|
| <ul style="list-style-type: none"><li>• Board prototyping</li><li>• PCB design and construction</li><li>• Creation of specific Firmware for the designed boards</li><li>• Profitable reading of the relevant Datasheets</li></ul> | <ul style="list-style-type: none"><li>• Use of laboratory equipment</li><li>• Use of machinery for rapid prototyping</li><li>• Soft-skills in group interaction</li><li>• Experimental systems analysis</li></ul> |
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**Courses and Certificates**

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- |  |               |
|--|---------------|
| <ul style="list-style-type: none"><li>• Corso Certificato di WinCC_AO tenuto dalla Simens di 18h</li></ul> | <p>5/2021</p> |
|--|---------------|

Ing. Emanuele Alfano