# Federico Massa

*Ph.D. Student in Robotics, MSc in Physics*

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## Professional Profile

My background is in Physics (BSc and MSc), which provided me with advanced physics, mathematics and statistics skills. In 2016, I started a collaboration with the Robotics Research Center "E.Piaggio" of the University of Pisa, where I started a Ph.D. in 2017 focusing on Autonomous Driving. I am currently part of *Roboteam-Italia*, one of the teams of Roborace, an autonomous full scale electric racing car competition. I have always had a strong inclination toward software development (especially for robotics applications), which led me to delve into the development of the team perception system (based on lidar sensors) and on a driving simulator that the team uses to test the whole perception-control pipeline.

## Education

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| 2017–present | **Ph.D. Student in Robotics**, *Research Center E. Piaggio*. |
| 2016–2017 | **Research contract**, *Research Center E. Piaggio*. |
| 2013–2016 | **MSc in Physics**, *University of Pisa*, 110/110 cum laude. |
| 2010–2013 | **BSc in Physics**, *University of Cagliari*, 110/110 cum laude. |
| 2005–2010 | **Scienfitic High School Diploma**, *Lic. Sc. Pitagora (Selargius)*, 100/100 cum laude. |

## Experience

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| 2019 | **Roborace event**, *Zala Zone (Hungary)*, Perception module developer for Roboteam-Italia team. |
| 2019–present | **Teaching assistant**, *University of Pisa (Italy)*, "Introduction to ROS" for the Distributed Robotic Systems course, MSc in Robotics and Automation. |
| 2018–present | **Perception module team leader**, *Research Center E. Piaggio (Italy)*, Roboteam-Italia team, Developing a lidar-based mapping and localisation system for autonomous racing cars. |
| 2018–present | **Simulation module team leader**, *Research Center E. Piaggio (Italy)*, Roboteam-Italia team, Developing a simulator based on Unreal Engine 4 to simulate the whole Roborace autonomous racing competition. |
| 2018 | **Roborace event**, *Berlin (Germany)*, Perception module developer for Roboteam-Italia team. |
| 2018 | **Introduction to Mobile Robotics**, *ITIS Livorno*, held a workshop on Robotics for High School students. |
| 2016 | **Master thesis**, *Geneva (Switzerland)*, Brief stay at CERN under the ITk group (ATLAS experiment). |
| 2016 | **Workshop**, *Alghero (Italy)*, Participation to the "XIII Seminar on Software for Nuclear, Subnuclear and Applied Physics": Geant4 framework and GPU programming. |

## Core Skills

- Lidar-based mapping and localization
- Driving simulators development
- Classical/Relativistic/Quantum Physics
- Statistical data analysis
- Particle/Kalman filters implementation
- Advanced calculus and differential calculus
- Monte Carlo simulations
- Reinforcement Learning

## Programming Skills

- C++ (strong)
- Matlab/Simulink
- Multithreaded applications programming
- Qt/Qt Quick framework
- C#
- ROS
- Unreal Engine 4
- PhysX basics
- Bash scripting
- Python

## Languages

- Italian (mother tongue)
- English (fluent)
- Spanish (intermediate)

## Publications

[1] D. Caporale, A. Settimi, F. Massa, F. Amerotti, A. Corti, A. Fagiolini, M. Guiggiani, A. Bicchi, L. Pallottino: "Towards the Design of Robotic Drivers for Full-Scale Self-Driving Racing Cars", IEEE International Conference on Robotics and Automation (ICRA), 2019

[2] D. Caporale, A. Fagiolini, L. Pallottino, A. Settimi, A. Biondo, F. Amerotti, F. Massa, S. De Caro, A. Corti, L. Venturini: "A Planning and Control System for Self-Driving Racing Vehicles", IEEE Research and Technologies for Society and Industry (RTSI), Sept. 2018