



# Samuele Bordini

## WORK EXPERIENCE

**THE BIOROBOTICS INSTITUTE, SANT'ANNA SCHOOL OF ADVANCED STUDIES** – PONTEDERA, ITALY  
**POST-GRADUATE RESEARCH FELLOW** – 20/09/2024 – 31/10/2024

**PISA UNIVERSITY** – PISA, ITALY  
**STUDENT** – 01/09/2017 – 06/06/2024

## EDUCATION AND TRAINING

25/09/2017 – 28/04/2021 Pisa, Italy  
**BACHELOR DEGREE** Pisa University

Grade Point Average: 25.0/30

**Field of study** Management Engineering | **Final grade** 102 | **Thesis** Advance aspects of sliding and rolling friction

28/09/2021 – 06/06/2024 Pisa, Italy  
**MASTER DEGREE IN ROBOTICS AND AUTOMATION ENGINEERING** Pisa University

Grade Point Average: 29.9/30

**Field of study** Robotic and Automation Engineering | **Final grade** 110 cum laude |

**Thesis** Distributed Control on a Modular Continuum Soft Arm

02/11/2024 – CURRENT Pisa, Italy  
**PHD STUDENT** Centro E. Piaggio, University of Pisa, 56120, Pisa (PI), Italy

Project Title: "Shared-Autonomy Architectures for Assistive Robotics in Healthcare Environments - FIT4MEDROB"  
Supervisors: G. Grioli, M. Catalano, A. Munafo, A. Bicchi

## LANGUAGE SKILLS

Mother tongue(s): **ITALIAN**

Other language(s):

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	B2	C1	B2	B2	C1
<b>SPANISH</b>	B1	B1	B1	B1	B1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

## SKILLS

LaTeX | Git | Matlab/Simulink | Python | C/C++ | ROS | Gazebo | RVIZ | MoveIT | Mathematica | CasADi | Java | SQL | R Studio | Linux | Docker | Solidworks software | Microsoft Office

## PROJECTS

04/11/2023 – CURRENT  
**Distributed Control on a Modular Continuum Soft Arm**

During my master thesis in the BRAIR Lab of the Biorobotic Institute at Sant'Anna School of Advance Studies, I developed a novel model-based control strategy to perform position regulation tasks with shape constraints. It is inspired by distributed system theory and by bioinspiration from plant responses. After the development of the control law, the first phase of testing was MATLAB simulation to implement the new control law with the Piece-wise Constant Curvature model and virtual communication to achieve collaboration between different modules of the manipulator using the CasADi symbolic tool. Then, the algorithm was tested on an I-Support robot with three modules using ROS and C++.

20/03/2023 – 10/10/2023

---

### **Reverse Priority algorithm to perform a Human-Like trajectory in a reaching task.**

---

Academic project for 'Controllo dei Robot'. As a team of three people, I implemented the Reverse Priority algorithm to perform a Human-Like trajectory in a reaching task for the Franka Emika Panda + Compact Soft Wrist + qb-SoftHand1 kinematic chain.

The project phases were the algorithm simulation in MATLAB, MoveIt implementation, Gazebo implementation, experimental validation with ROS, and C++.

12/09/2022

---

### **Building a Self-Balancing Robot from Scratch: Real-Time Control Implementation.**

---

Academic project for 'Informatica e Sistemi in Tempo Reale'. As a team of two people, I built a self-balancing robot with an Arduino Uno that communicates via a serial port in real-time with a program (C language with Allegro and Pthread library) that compares the state of the real robot with the state of a nominal model of this and shows the result in a graphical interface.

01/02/2023

---

### **Robust Control for a Self-Balancing Robot.**

---

Academic project for 'Controllo dei Sistemi Incerti'. As a team of two people, I implemented many different types of robust controllers (H-inf, DK-iteration and LQG) for a Segway system in MATLAB and Simulink.

10/10/2023

---

### **Adaptive Control of Robot Manipulators With Uncertain Kinematics and Dynamics.**

---

Academic project for 'Controllo dei Robot'. I implemented the combination of dynamic and kinematic Adaptive Control for a 3 DoF manipulator to perform a trajectory tracking task in MATLAB and Simulink.

10/10/2023

---

### **Feedback Linearization, Observability, and Controllability Analysis of Flapping-Wing Micro-Aerial Vehicles.**

---

Academic project for 'Controllo dei Robot'. I implemented the tools to analyse the observability and controllability properties of a nonlinear system: Flapping-Wing Micro-Aerial Vehicles. Then, the system is controlled by the implementation of a Feedback-Linearization.

01/02/2023

---

### **Extended Kalman Filter and Particle Filter for an Automated Guided Vehicle (AGV).**

---

Academic project for 'Identificazione dei Sistemi Incerti'. As a team of two people, I implemented the Extended Kalman Filter and Particle Filter for an Automated Guided Vehicle (AGV) in MATLAB and Simulink.

31/10/2023

---

### **Position and Attitude Estimation with a Complementary Filter.**

---

Academic project for 'Sistemi di Guida e Navigazione'. As a team of three people, I implemented a complementary filter using signals from GPS, IMU, and magnetometer to estimate the position and attitude of an autonomous catamaran in MATLAB and Simulink.

15/02/2023

---

### **Machine and Deep Learning for ECG signals.**

---

Academic project for 'Intelligent Systems'. As a team of two people, I implemented many machine learning and deep learning tools and a fuzzy system to perform forecasting, classification, and fitting tasks with a physiological signal in MATLAB.

30/06/2021

## **Tobacco Consumption Time-series Analysis.**

---

Academic project for 'Probabilità e Processi Stocastici'. I implemented many tools for the statistical analysis of time series. The aim was the analysis of tobacco consumption in USA from 1915 to 1944 to predict future trends. The tools that I used are: autocorrelation, power-spectrum, additive and multiplicative decomposition, Holt-Winters and ARIMA model. I implemented it in R Studio.

25/01/2024

## **F1 Telemetry Analysis.**

---

Academic project for 'Dinamica dei Veicoli'. I analyzed the real telemetry of an F1 car. The objectives were trajectory reconstruction, curve analysis with an inflection circle, moving centrodes, a 'creative' stability index, and signal filtering in Mathematica.

## ● **PUBLICATIONS**

---

2020

### **Diversity Management in Companies and Organization**

---

I participated in the writing of a book chapter titled 'Diversity Management in Companies and Organizations' by Serena Gianfaldoni and Caterina Greco (2020).

Serena Gianfaldoni, Caterina Greco

## ● **CERTIFICATES**

---

28/05/2020

### **Strumenti per la prevenzione e il contrasto alla violenza di genere in ambito lavorativo**

---

Progetto Vietato Violare, organized by CAFRE and Pisa University

17/12/2023

### **Guida Sicura e Veloce**

---

Corso Automobili, organized by Formula Guida Sicura and Pisa University.

10/10/2023

### **Industria 4.0**

---

Organized by Pisa University

## ● **HOBBIES AND INTERESTS**

---

### **SPORT**

---

I played agonistic football for eighteen years until 2021, competing from 2011 to 2018 in the Professional Championship with Spezia Calcio. I have coached a team of 12-year-olds for 2 years and a half.

### **PASSIONS AND HOBBIES**

---

I am particularly passionate about music; I play piano and guitar. I love to read, especially scientific and philosophical essays. I also have a strong interest in figurative art and movies. I play tennis and chess in my spare time. I also enjoy cooking and hiking in the mountains.