



# Stefano Angeli



 [www.linkedin.com/in/StefanoAngeli12](https://www.linkedin.com/in/StefanoAngeli12)

 GitHub profile

## WORK EXPERIENCE

November 2023 – present

### Research Fellow

Research Center “E. Piaggio” - Pisa, Italy

- Research Grant: *“Study, development and implementation of planning and control strategies for pick and place/throwing cluttered objects with advanced industrial manipulators and elastic grippers.”*
- Scientific Sector: Systems and control engineering
- Objective: The objective of this research is to develop and implement real-time planners and controllers that make possible the dynamic grasping of objects in narrow and cluttered spaces and placing/throwing them in desired boxes starting from existing methodologies. This research has been carried out within the DARKO (Dynamic Agile Production Robot That Learn and Optimise Knowledge and Operations) European Project framework.  
[DARKO European Project Website](#)
- Supervisors: Prof. Antonio Bicchi, Prof. Paolo Salaris.

February 2022 – October 2023

### Research Fellow

Research Center “E. Piaggio” - Pisa, Italy

- Research Grant: *“Study and development of robotics handtools and control algorithms for advanced industrial manipulators”*.
- Scientific Sector: Systems and control engineering
- Objective: The objective of this research is to develop and design pneumatic grasping tools capable of throwing objects beyond the robot’s kinematic workspace in order to maximize process efficiency. The entire pneumatic system has been tested on the Franka Emika robot by using the ROS C++ interface. This research has been carried out within the DARKO (Dynamic Agile Production Robot That Learn and Optimise Knowledge and Operations) European Project framework.  
[DARKO European Project Website](#)
- Supervisors: Prof. Antonio Bicchi, Prof. Paolo Salaris.

December 2021 – January 2022

### Research Collaborator

Research Center “E. Piaggio” - Pisa, Italy

- Research Topic: Study and implementation of throwing strategies for collaborative robots within the DARKO (Dynamic Agile Production Robot That Learn and Optimise Knowledge and Operations) European Project framework.  
[DARKO European Project Website](#)
- Business or Sector: Robotics Research

## EDUCATION AND TRAINING

2016 – 2021

### Master’s degree in Robotics and Automation Engineering

Università di Pisa, 110/110.

- Thesis Title: *“Study and development of optimal control strategies to enhance capabilities of a collaborative robot in throwing objects”*
- Thesis Description: The dissertation aimed to find a throwing strategy for the collaborative robot UR10e to throw an object with a limited mass. The throwing trajectory planning was solved with nonlinear constrained optimization methods by using the MATLAB optimization toolbox.
- Supervisors: Prof. Antonio Bicchi, Prof. Paolo Salaris, Eng. Alessandro Palleschi.

2011 – 2016 **Bachelors's degree in Biomedical Engineering**

Università di Pisa, 101/110.

- Thesis Title: "*Finite element method (FEM) analysis of the extrusion process of hydrogels*"
- Thesis Description: The dissertation aimed to model the extrusion process of a polypeptide hydrogel produced at University of Manchester. The extrusion process has been modelled by using the COMSOL multiphysics simulation software.
- Supervisors: Prof. Giovanni Vozzi, Eng. Carmelo De Maria.

2006 – 2011 **Italian Secondary School Diploma**

Liceo Scientifico "Enrico Fermi", Massa (MS), Italy, 87/100.

**PROJECT EXPERIENCE**

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**Professional projects**

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2023 **Doctoral Summer School on Robotics and Intelligent Machines: Co-teaching assignment**

Volterra, 30 August-05 September 2023

- As a co-teacher, I contributed to the GitHub repository of Mechatronics and Robotics Lab for Innovation of Politecnico di Milano by writing a package based on ROS services for planning and control the ABB YuMi robot equipped with a 2-finger gripper using the MoveIt! C++ interface to perform tasks involving the manipulation of a 6-sided die. [Merlin Laboratory GitHub repository](#)

**DARKO Project Integration Milestone**

Arena 2036, Stuttgart, 11-17 June 2023

- During the integration week, I tested the ROS C++ packages developed during the previous pre-integration project for the Franka Emika robot mounted on the mobile robotic platform to perform pick and place tasks for moving objects such as small items like gaskets, screws, and bolts from a shelf towards a fixed box placed on a conveyor belt. My contribution was on planning and control, working collaboratively with other partners to ensure integration with other areas like perception and human-robot interaction. A live demonstration was performed in front of the project's stakeholder to show complex manipulation and navigation tasks with the mobile robotic platform.

**DARKO Project Pre-Integration Milestone**

Arena 2036, Stuttgart, 19-23 April 2023

- During the pre-integration week, I wrote and tested the ROS C++ service for the human-like trajectory planning on the Franka Emika robot. Software and hardware integration have been done on the DARKO mobile robotic platform to integrate ROS packages for motion planning and control.

2022 **Demo Maker Faire Rome - The European Edition**

Rome, 10-14 October 2022

- As part of DARKO project, I programmed the Franka Emika robot with the MoveIt! C++ interface in ROS equipped with an anthropomorphic gripper for pick and throw tasks using the pneumatic hand-tool equipped with a suction cup. The entire demo involved creating a demonstration of the robot's capabilities, which included picking objects from a shelf by using a vacuum action and throwing them towards a target outside the robot's kinematic workspace.

## Academic projects

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- 2020 **Implementation of dynamic controllers on the Franka robot and optimal adaptive control**  
Research Center "E. Piaggio", Prof. Antonio Bicchi, Prof. Paolo Salaris, Robot Control.
- Implementation and testing of dynamics controllers (Proportional Derivative, Computed torque and Backstepping control) with the robot-control framework (*Ros Control*) of ROS on the Franka Emika robot.  
From joint position and velocity measurements, nonlinear model-based dynamic control techniques have been applied to follow references by using joint torque command interface.
  - Study on optimal trajectories for the estimation of the robot parameters for kinematic and dynamic adaptive control.  
Studied a potential method for finding persistently exciting trajectories for parameter identification in the case of an RR planar manipulator. The method is based on an optimization for maximizing the smallest singular value of the convolution integral of the regressor.
- 2019 **Study and characterization of the directivity index for linear and volumetric arrays**  
Università di Pisa, Prof. Andrea Caiti, Underwater system.
- Spherical hydrophones with omnidirectional beam pattern were assembled to create linear and volumetric arrays with several geometries to maximize the Directivity Index (DI) of the entire array using the Antenna Toolbox of MATLAB.
- 2017 **Analysis of the inverse differential kinematics and dynamics of a 4 DOF translational parallel robot manipulator**  
Università di Pisa, Prof. Marco Gabiccini, Robot Mechanics.
- Starting from the kinematics and dynamics model of the *Tripteron*, a 3 DOF translational parallel manipulator, inverse differential kinematics and dynamics of the 4 DOF *Quadrupteron* translational parallel manipulator were studied and implemented using the Wolfram Mathematica software.

## PATENT

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- 2023 **Gripper a Vuoto**, August 2023. Angeli S., Salaris P., Catalano MG., Bicchi A. (Accepted at Ufficio Italiano Brevetti e Marchi (UIBM))
- My contribution to the patent encompassed several key aspects, starting with the mechanical design of the pneumatic tool using Creo Parametric software. I was responsible for assembling the components to construct the entire pneumatic system and developing ROS packages to control and interface with it. The final phase of my involvement included conducting experimental tests with the Franka Emika Panda robot to validate the functionality and performance of the integrated system.

## PROCEEDINGS OF INTERNATIONAL MEETINGS

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- De Maria C, Chiesa I, **Angeli S**, De Acutis A, Mattei G, Montemurro F, Smith AM, Saiani A, Vozzi G. *Modelling of scaffold fabrication with a pH-sensitive hydrogel*. Biofabrication 2016, 29-31 October, Winston-Salem, NC, USA.
- De Maria C, Chiesa I, **Angeli S**, De Acutis A, Mattei G, Montemurro F, Smith AM, Saiani A, Vozzi G. *3D bioprinting of self-assembling hydrogels*. TERMIS 2016, 28 June – 1 July, Uppsala, Sweden.

## PROCEEDINGS OF NATIONAL MEETINGS

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- De Maria C, Chiesa I, **Angeli S**, De Acutis A, Montemurro F, Mattei G, Smith AM, Saiani A, Vozzi G. *Characterization and biofabrication of a pH-sensible hydrogel*. V Congress of the National Group of Bioengineering, Napoli, 20-22 June 2016.

## PERSONAL SKILLS

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Mother tongue Italian

Language **English – B2**

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2: Proficient user  
Common European Framework of Reference for Languages

Additional Experience English Certificate B2 Level (86/100) - *Centro Linguistico Interdipartimentale (CLI)*, 2022, Università di Pisa.

## JOB-RELATED SKILLS

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|---|--|
| • C++ - <i>Proficient</i>                         | • LaTeX - <i>Competent</i>                   |
| • Object Oriented Programming - <i>Proficient</i> | • Windows, Linux - <i>Proficient</i>         |
| • ROS - <i>Advanced</i>                           | • COMSOL Multiphysics - <i>Competent</i>     |
| • Gazebo - <i>Advanced</i>                        | • Wolfram Mathematica - <i>Competent</i>     |
| • MoveIt! - <i>Skilled</i>                        | • Microsoft Office - <i>Proficient</i>       |
| • MATLAB/Simulink - <i>Proficient</i>             | • Element Finite Analysis - <i>Competent</i> |
| • Git - <i>Proficient</i>                         | • PTC Creo Parametric - <i>Competent</i>     |
|   | • Docker - <i>Competent</i>                  |

## SOFT SKILLS

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|-------------------|----------------|
| • Problem Solving | • Teamwork     |
| • Communication   | • Autonomy     |
| • Flexibility     | • Adaptability |

## ADDITIONAL INFORMATION

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Driving licence B

## PRIVACY

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Personal data I hereby authorize the use of my personal data in accordance to the GDPR 679/16 -

"European regulation on the protection of personal data".

Date February 8, 2024

Signature