

# Maria Pozzi

## Curriculum Vitae

### Current Position

- 15<sup>th</sup> Nov. **Postdoctoral researcher in Robotics and Automation**, Dept. of Information Engineering and Mathematics, University of Siena.  
2020 –  
Present **Project:** Study of new techniques of human-robot interaction through haptic systems, under the PRIN 2017 Project PROT. 2017SB48FP TIGHT (Tactile InteGration for Humans and arTificial systems).  
**Scientific responsible:** Prof. Monica Malvezzi.  
**Research group:** "Siena Robotics and Systems Lab (SIRSLab)", Link.  
**Research topics:** human-robot collaboration, wearable haptic interfaces, robotic grasping and manipulation, underactuated and compliant robotic hands, robotics in education.

### Past Positions

- 2018 – 2020 **Postdoctoral researcher in Robotics and Automation**, Dept. of Information Engineering and Mathematics, University of Siena.  
**Project:** Robot control in manipulation and collaboration tasks with the human: role of intrinsic compliance and physical interaction with the user and the environment, under the European Project N. 780073 INBOTS CSA (Inclusive Robotics for a Better Society).  
**Scientific responsible:** Prof. Monica Malvezzi

### Education

#### School and University

- 2015 – 2018 **PhD in Information Engineering and Science**, Dept. of Information Engineering and Mathematics, University of Siena and Dept. of Advanced Robotics, Istituto Italiano di Tecnologia (IIT), Genova, Italy.  
**Supervisor:** Prof. Domenico Prattichizzo (University of Siena)  
**Co-Supervisors:** Prof Monica Malvezzi (UNISI), Prof. Darwin Caldwell (IIT).  
**Thesis title:** Grasping and Manipulation with Soft Robotic Hands  
**Graduation date:** April 18th, 2019  
**Final mark:** Excellent *cum laude*
- 2013–2015 **Master of Science in Computer and Automation Engineering**, (*Language: English*), University of Siena, Italy.  
Average exams grade: 29.8/30 (GPA=4.0), final mark: 110/110 *cum laude*  
Thesis title: *On the Quality of the Grasp for Underactuated and Compliant Hands*.
- 2010–2013 **Bachelor in Computer and Information Engineering (Track: Robotics and Automation)**, (*Language: Italian*), University of Siena, Italy.  
Average exams grade: 29.5/30 (GPA=3.94), final mark: 110/110 *cum laude*  
Thesis title: *Hand Models for Robotics Applications: Analysis and Implementation*.

2005–2010 **High School: Liceo Classico Enea Silvio Piccolomini, Siena, Italy, School-leaving examination mark: 100/100.**

Training courses

2020 **Training course about European Union and European Funding Programmes, University of Siena, Lectures (24 hours), laboratory (12 hours).**

2018 **Training course for teachers, University of Siena, Additional courses and exams for the training of school teachers.**

Passed Exams (24 European University Credits (ECTS) in total): Methodological and technological approaches for teaching, Theories and methods of learning, Cultural anthropology, Theory and models for planning, monitoring and evaluating educational programs.

## --- Publications

I am co-author of 20 articles (105 citations, H-index=6, from Google Scholar) published in international peer-reviewed books, journals, and conference proceedings.

### International Journal Articles

1. Maria Pozzi, Sara Marullo, Gionata Salvietti, Joao Bimbo, Monica Malvezzi, and Domenico Prattichizzo. Hand closure model for planning top grasps with soft robotic hands. *The International Journal of Robotics Research*, 39(14):1706–1723, 2020
2. C. Gaudeni, M. Pozzi, Z. Iqbal, M. Malvezzi, and D. Prattichizzo. Grasping with the softpad, a soft sensorized surface for exploiting environmental constraints with rigid grippers. *IEEE Robotics and Automation Letters*, 5(3):3884–3891, 2020
3. S. Marullo, M. Pozzi, D. Prattichizzo, and M. Malvezzi. Cooperative human-robot grasping with extended contact patches. *IEEE Robotics and Automation Letters*, 5(2):3120–3127, 2020. [This paper was also accepted for presentation at ICRA 2020]
4. M. Malvezzi, Z. Iqbal, M. C. Valigi, M. Pozzi, D. Prattichizzo, and G. Salvietti. Design of multiple wearable robotic extra fingers for human hand augmentation. *Robotics*, 8(102):1–21, 2019
5. J. Bimbo, E. Turco, M. Ardahani, M. Pozzi, G. Salvietti, M. Malvezzi, and D. Prattichizzo. Exploiting robot hand compliance and environmental constraints for edge grasps. *Frontiers in Robotics and AI*, (0), 2019
6. V. Ruiz Garate, M. Pozzi, D. Prattichizzo, N. Tsagarakis, and A. Ajoudani. Grasp stiffness control in robotic hands through coordinated optimization of pose and joint stiffness. *IEEE Robotics and Automation Letters*, 3(4):3952–3959, October 2018. (This article has also been accepted for presentation at 2018 IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS))
7. A. Casalino, C. Messeri, M. Pozzi, A. M. Zanchettin, P. Rocco, and D. Prattichizzo. Operator awareness in human-robot collaboration through wearable vibrotactile feedback. *IEEE Robotics and Automation Letters*, 3(4):4289–4296, October 2018. (This article has also been accepted for presentation at 2018 IEEE/RSJ Int. Conf. on Intelligent Robots and Systems (IROS))
8. M. Pozzi, G. Salvietti, J. Bimbo, M. Malvezzi, and D. Prattichizzo. The closure signature: A functional approach to model underactuated compliant robotic hands. *IEEE Robotics and Automation Letters*, 3(3):2206–2213, July 2018. (This article has also been accepted for presentation at 2018 IEEE Int. Conf. on Robotics and Automation (ICRA) and was awarded with Best Oral Presentation at I-RIM 3D)
9. V. Ruiz Garate, M. Pozzi, D. Prattichizzo, and A. Ajoudani. A bio-inspired grasp stiffness control for robotic hands. *Frontiers in Robotics and AI*, 5, July 2018

10. M. Pozzi, M. Malvezzi, and D. Prattichizzo. On grasp quality measures: Grasp robustness and contact force distribution in underactuated and compliant robotic hands. *IEEE Robotics and Automation Letters*, 2(1):329–336, January 2017. (This article was selected as finalist for the I-RAS Young Author Best Paper Award 2018)

#### Entries in Encyclopedias

1. D. Prattichizzo, M. Pozzi, and M. Malvezzi. *Dexterous Manipulation*. Encyclopedia of Robotics, H. M. Ang, O. Khatib, B. Siciliano (eds). Springer, Berlin, Heidelberg, 2020
2. D. Prattichizzo and M. Pozzi. *Robot Grasp Control*. Encyclopedia of Systems and Control, J. Baillieul and T. Samad (eds). Springer, London, 2020

#### Book Chapters

1. M. Pozzi, D. Prattichizzo, and M. Malvezzi. On-line educational resources on robotics: A review. In José L. Pons, editor, *Inclusive Robotics for a Better Society*, pages 141–147. Springer International Publishing, Cham, 2020
2. G. Gioioso, M. Pozzi, M. Aurilio, B. Peccerillo, G. Spagnoletti, and D. Prattichizzo. Using wearable haptics for thermal discrimination in virtual reality scenarios. In H. Kajimoto, D. Lee, S-Y. Kim, M. Konyo, and K-U. Kyung, editors, *Haptic Interaction*, pages 144–148. Springer Singapore, Singapore, 2019
3. L. Masia, I. Hussain, M. Xiloyannis, C. Pacchierotti, L. Cappello, M. Malvezzi, G. Spagnoletti, C.W. Antuvan, D.B. Khanh, M. Pozzi, and D. Prattichizzo. Soft wearable assistive robotics: exosuits and supernumerary limbs. In *Wearable Exoskeleton Systems: Design, control and applications*, Control, Robotics and Sensors, pages 219–254. Institution of Engineering and Technology, 2018

#### Peer-Reviewed Conference Papers

1. M. Pozzi, C. Gaudeni, Z. Iqbal, D. Prattichizzo, and M. Malvezzi. Modeling a sensorized soft layer for adding compliance to the environment in robotic manipulation. In *Advances in Italian Mechanism Science*, pages 370–377, Cham, 2021. Springer International Publishing
2. K. Katayama, M. Pozzi, Y. Tanaka, K. Minamizawa, and D. Prattichizzo. Shared haptic perception for human-robot collaboration. In *Haptics: Science, Technology, Applications*, pages 536–544, Cham, 2020. Springer International Publishing
3. Maria Pozzi, Monica Malvezzi, and Domenico Prattichizzo. Mooc on the art of grasping and manipulation in robotics: Design choices and lessons learned. In Wilfried Lopuschitz, Munir Merdan, Gottfried Koppensteiner, Richard Balogh, and David Obdrzalek, editors, *Robotics in Education*, pages 71–78, Cham, 2019. Springer International Publishing
4. M. Pozzi, E. Miguel, R. Deimel, M. Malvezzi, B. Bickel, O. Brock, and D. Prattichizzo. Efficient fem-based simulation of soft robots modeled as kinematic chains. In *Proceedings of the IEEE International Conference on Robotics and Automation*, May 2018
5. M. Pozzi, A. M. Sundaram, M. Malvezzi, D. Prattichizzo, and M. A. Roa. Grasp quality evaluation in underactuated robotic hands. In *Proc. IEEE/RSJ Int. Conf. Intelligent Robots and Systems*, pages 1946–1953, October 2016

## Patents

1. D. Prattichizzo, M. Pozzi, P. Rocco, A.M. Zanchettin., Metodo per generare un segnale di consapevolezza di un robot collaborativo e relativo sistema hardware (tr. Method to generate an awareness signal of a collaborative robot and related hardware system). National Application N. 102018000007934, 7.8.18

## Research Grants

- Nov. 2018 **RAS Haptics Grant**, I was awarded with a 2500 USD research grant promoted by the IEEE RAS TC on Haptics under the "Innovation in haptics" research programme for the project *WHOT? Wearable haptics for fluent Human-robot collaboration*.

## Awards and Honors

- Dec. 2020 **Finalist for Best Paper on Mechanical Design of Robots**, Italian Conference of Robotics and Intelligent Machines (I-RIM 3D 2020).
- Oct. 2019 **Best Oral Presentation**, 1st Italian Conference of Robotics and Intelligent Machines (I-RIM 3D 2019).
- Sep. 2018 **IROS Student and Developing Countries (SDC) Travel Award**, Travel grant for participating to the IROS Conference 2018 (Madrid, Spain).
- Sep. 2018 **Finalist for the "Fabrizio Flacco" Young Author Best Paper Award 2018\***, Paper: *On Grasp Quality Measures: Grasp Robustness and Contact Force Distribution in Underactuated and Compliant Robotic Hands*.
- May 2018 **ICRA PhD forum Travel Award**, Travel grant to present a poster at the PhD Forum of the ICRA Conference 2018 (Brisbane, Australia).
- Jul. 2017 **Women in Robotics Travel Grant**, Travel grant to present a poster at the 2017 Women in Robotics Workshop at the Robotics: Science and Systems (RSS) conference.
- Apr. 2016 **Best Presentation**, Title: The Quality of Grasp for Underactuated and Compliant Robotic Hands, at the Multibody Dynamics Workshop 2016, Parma, Italy.
- Feb. 2016 **Best Master Thesis of 2015**, I was awarded the "Renato Mariani" degree award for the year 2015.
- 2014 **Best graduate student of 2012-2013**, I was awarded of best graduate student of the course in Computer and Information Engineering of the academic year 2012-2013.
- 2011 **Scholarship for meritorious female students by the Tuscany Region** enrolled in the 1<sup>st</sup> year of graduate programs of science and engineering in 2010/2011.

## Organized Workshops

- 10 Dec., 2020 F. Negrello, V. Ruiz Garate, M. Pozzi, L. Pallottino, **Human Factors in the design and control of robots: What are we missing**, Italian Conference of Robotics and Intelligent Machines (I-RIM 3D 2020), Virtual conference, Link.
- 2 Sep., 2020 M. Pozzi, T. Lisini Baldi, M. Bianchi, D. Prattichizzo, **Tactile Integration for humans and artificial systems (II edition)**, IEEE RO-MAN 2020, Virtual conference, Link.

- 20 Oct., 2019 T. Lisini Baldi, M. Pozzi, M. Bianchi, D. Prattichizzo, **Tactile Integration for humans and artificial systems**, I-RIM 3D 2019, Rome, Italy, Link.
- 23 Jun., 2019 M. Pozzi, V. R. Garate, M. A. Roa, **Emerging paradigms for robotic manipulation: from the lab to the productive world**, Robotics Science and Systems (RSS) 2019, Freiburg, Germany, Link.
- 10 Oct., 2016 M. A. Roa, D. Prattichizzo, M. Malvezzi, M. Pozzi, **Evaluation and Benchmarking of Underactuated and Soft Robotic Hands**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), October 2016, Daejeon, Korea, Link.

#### Invited Talks

- 10 Dec., 2020 "Wearable haptics for fluent human-robot collaboration", Workshop on Socio-Physical Interaction Skills for Cooperative Human-Robot Systems in Agile Production, Italian Conference of Robotics and Intelligent Machines (I-RIM 3D 2020)
- 22 Jul., 2020 "Human-Centered Robotics", INBOTS webinar on Robotics Education, jointly organized by University of Siena and EDUMOTIVA
- 10 Nov., 2018 "La robotica al servizio dell'uomo" (tr. Human-centered robotics), first event of the project "SI FA STEM" organized by Soroptimist International Club of Siena to promote STEM subjects among high school female students.
- 14 May, 2018 "Mani robotiche: la sfida è renderle soft" (tr. Robotic hands: the challenge is to make them soft), A Pint of Science, Siena, Italy.
- 22 Jun., 2016 "Syngrasp: un toolbox MATLAB per la simulazione di mani robotiche" (tr. Syngrasp: a MATLAB for the simulation of robotic hands), MATLAB EXPO 2016 ITALIA, Milan, Italy.

#### Communication Skills

In addition to the listed invited talks, I presented my research activities in several international and national conferences and meetings.

##### Oral or Poster Presentations

- International and national conferences IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Robotics Science and Systems (RSS), International Conference on Soft Robotics (RoboSoft), International Conference on Robotics in Education (RiE), Automatica.it, Convegno Nazionale Gruppo di Meccanica Applicata (GMA), International Federation for the Promotion of Mechanism and Machine Science (IFTToMM) ITALY Conference.
- EU projects meetings Final discussion on work package updates for INBOTS (Inclusive Robotics for a better Society) Project, Madrid, Spain (2020). Work package updates and deliverable discussion for INBOTS Project, Össur Head Office, Reykjavik, Iceland (2019). Work package updates for SOMA (Soft-bodied intelligence for manipulation) Project, Technische Universität Berlin (TUB), Germany (2017).

## Teaching and tutoring

- Mar. 2020 **Course on "Introduction to Robotics and to robotic manipulators"**, *Frontal lecture*, Master in "INDUSTRY 4.0 DESIGN: Enterprise Digitalization and 4.0 Technologies (2019/2020)", (4 hours).
- 4-22 Nov. 2019 **Course on "Mechanics and Control of Collaborative Robots"**, *Frontal lectures, exercises, and final test*, Harbour.Space University, Barcelona, (45 hours), [Link](#).
- Oct. 2018 – **Tutoring**, *Frontal lectures, exercises and support during exams for the course of*  
Mar. 2019 *Foundations of Computer Science*, (30 hours), University of Siena.
- Feb. 2018 – **Course on "Robotics" for the project Worker4.0, funded by the Tuscany**  
Mar. 2018 **Region**, *Frontal lectures, exercises, and final test*, (30 hours).
- Oct. 2017 – **Tutoring**, *Frontal lectures, exercises and support during exams for the course of*  
Feb. 2018 *Foundations of Computer Science*, (20 hours), University of Siena.
- 2017 **On-line course**, *The Art of Grasping and Manipulation in Robotics*, [Link](#).

## Collaboration to EU Research Projects

- From June 2016 Participation to the proposal writing of several research projects, including:
- INBOTS - Inclusive Robotics for a Better Society
- From November 2015 Participation to the research activities and report writing related to the following European research projects:
- INBOTS - Inclusive Robotics for a Better Society
  - SoftPro - Synergy-based Open-source Foundations and Technologies for Prosthetics and Rehabilitation
  - SOMA - Soft-bodied intelligence for Manipulation
  - WEARHAP - WEARable HAPtics for humans and robots

## Professional and University Service

### Reviewer

Since 2016, I revised over 70 papers for the following international journals and conferences:

- International Journals IEEE Transactions on Robotics, IEEE Robotics and Automation Magazine, IEEE/ASME Transactions on Mechatronics, IEEE Robotics and Automation Letters, IEEE Transactions on Haptics, International Journal of Robotics Research, Robotics and Autonomous Systems, International Journal of Advanced Robotic Systems, Frontiers in Neurorobotics, Frontiers in Robotics and AI.

International Conferences IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), International Conference on Automation Science and Engineering (CASE), IEEE International Conference on Biomedical Robotics and Biomechatronics (BIOROB), IEEE/RAS-EMBS International Conference on Rehabilitation Robotics (ICORR), IEEE International Conference on Robot and Human Interactive Communication (RO-MAN), IEEE World Haptics Conference (WHC), IEEE International Conference on Human-Machine Systems (ICHMS), IFToMM ITALY International Conference, IEEE Haptics Symposium, Eurohaptics.

Associate Editor

- 2020 **Proposer, Associate Editor, and Corresponding Guest Editor** for the IEEE Robotics and Automation Magazine Special Issue on "Emerging Paradigms for Robotic Manipulation: from the Lab to the Productive World" (Link)  
University of Siena
- 2019-2020 **Representative of the Research Fellows**, Department of Information Engineering and Mathematics Board.
- 2018 **Representative of the Ph.D. Students**, Department of Information Engineering and Mathematics Board.
- Apr. 2013 – Jan. 2014 **Part-time paid collaboration activities for the University of Siena, Supervision at the Study Room "Sala Rosa"**, 200 hours, Siena, Italy.  
[www.sba.unisi.it/sala-rosa](http://www.sba.unisi.it/sala-rosa)

## Education: Exams and Courses

Attended PhD Courses and Summer Schools

- **Machine learning: from shallow to deep architectures**, Lectures held by Prof. Stefano Melacci, University of Siena.
- **Algorithms for constrained optimization**, Lectures held by Prof. Veronica Piccialli, University of Roma Tor Vergata.
- **Foundation and design of wearable haptics**, Lectures held by Prof. Domenico Prattichizzo, University of Siena.
- **Summer School on Soft Manipulation**, Fraueninsel Island on Lake Chiemsee, Germany.
- **Soft Skills Courses**: Spin-off and start up (16 hours), Open Data e research evaluation (8 hours), Scientific Writing and Presentation (8 hours), University of Siena.
- **Multibody Dynamics Workshop**, Parma, Italy, [www.multibodysummerschool.eu](http://www.multibodysummerschool.eu).
- **Models of Computation Inspired by the Functioning of the Living Cell**, Lectures held by Prof. Grzegorz Rozenberg, University of Leiden.
- **The Art of Manipulation and Grasping**, Lectures held by Prof. Domenico Prattichizzo, University of Siena.
- **Functional Analysis**, Lectures held by Prof. Paolo Nistri, University of Siena.
- **S.I.D.R.A. (Italian Control Systems Society) PhD Summer School**, Bertinoro, Italy, [sidra2016.dei.unibo.it](http://sidra2016.dei.unibo.it).
- **Modeling, Design and Rapid Prototyping of Mechanical Systems**, Lectures held by Prof. Monica Malvezzi, University of Siena.

### Exams of the Master's Degree (Average: 29.8/30)

- English (level B2), Passed
- Complex Dynamic Systems, 30/30 *cum laude*
- High Performance Computer Architecture, 30/30 *cum laude*
- Discrete-event Systems, 30/30 *cum laude*
- Network Optimization, 30/30 *cum laude*
- Mathematical Methods for Engineering, 30/30
- Sensors and Microsystems, 30/30
- Artificial Intelligence, 30/30
- Multivariable, Nonlinear and Robust Control, 30/30
- Machine Learning, 30/30
- System Identification and Data Analysis, 30/30 *cum laude*
- Design of Applications, Services and Systems, 28/30
- Human-Centered Robotics, 30/30 *cum laude*

### Exams of the Bachelor's Degree (Average: 29.5/30)

- English (level B1), Passed
- Analisi matematica 1 (Calculus 1), 30/30 *cum laude*
- Fondamenti di informatica (Foundations of information technology), 30/30 *cum laude*
- Algebra lineare (Linear algebra), 30/30
- Analisi Matematica 2 (Calculus 2), 30/30
- Fisica 1 (Physics 1), 27/30
- Ricerca operativa (Operational research), 30/30
- Sistemi dinamici (Dynamical systems), 30/30 *cum laude*
- Fisica 2 (Physics 2), 30/30 *cum laude*
- Elettrotecnica (Electrotechnics), 30/30 *cum laude*
- Elementi di analisi numerica, probabilità e statistica (Numerical analysis, probability and statistics), 30/30 *cum laude*
- Comunicazioni elettriche (Foundations of telecommunications), 30/30 *cum laude*
- Economia ed organizzazione aziendale (Foundations of economics), 30/30 *cum laude*
- Architettura dei calcolatori 1A (Computer architecture), 24/30
- Sistemi di controllo (Control systems), 30/30
- Tecnologie dei sistemi di controllo (Technologies for control systems), 30/30
- Misure elettroniche (Electrical measures), 30/30
- Elettronica (Electronics), 30/30
- Informatica industriale (Information technology for industrial applications), 30/30 *cum laude*
- Robotica (Robotics), 30/30 *cum laude*

### Experiences Abroad

2006 – 2007 **European School of Brussels, Brussels, Belgium**, I attended the second year of high school at the European School of Brussels (Ecole Européenne de Bruxelles I Uccle).

### Language Skills

I have a very good command of the English language and a reasonable knowledge of French. I also started studying German.

Overview:

Italian **Mothertongue**

English **Fluent**

French **Intermediate**

*Conversationally fluent, very good writing and listening*

*Good speaking, writing and listening*



Certificates:

- Jun. 2008 **PET (Preliminary English Test)**, *Level B1 according to the Common European Framework*, Mark: Pass with merit.
- Jun. 2009 **FIRST (First Certificate in English)**, *Level B2 according to the Common European Framework*, Mark: A (highest).
- Feb. 2013 **DELFB1 (Diplôme d'études en langue française, niveau B1)**, *Level B1 according to the Common European Framework*, Mark: 95.5/100.

Courses:

- Mar.-Jun. 2017 **German Course**, *Level A1.1 according to the Common European Framework*, 40 hours, University of Siena.
- Oct. 2014 – May 2015 **Academic English Course**, *Level C1 according to the Common European Framework*, 50 hours, University of Siena.