Gender:
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Linkedin:

Laura Morchi

I am a young and highly motivated biomedical-bionics engineer, with a background in medical robotics and signal processing. I graduated in University of Pisa; I obtained a joint Master Degree at University of Pisa and Scuola Superiore Sant'Anna in 2018 and a PhD in BioRobotics at Scuola Superiore Sant'Anna in 2022. Currently, I am working in the R&D of a spin-off project dealing with focused ultrasound and robotic surgery. I've always been strongly involved in sports. I used to swim competitively for 15 years, being member of a group, sharing team spirit. I never give up making time for my interests and discovering everything that can be explored.

Work experience

06/2022 – 03/2023	**Scholarship**
	The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy
	SOUNDSAFE Project – research activities related to the design, development and validation of a robotic platform for focused ultrasound surgery in the veterinary sector.
01/2022 – 05/2022	**Scholarship**
	The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy
	BioARM (Portable exoskeleton for the assistance of patients with brachial plexus injury in daily activities) and ICT SIMULY (Sensorized platform for simulated and in vivo monitoring of fetal head descent during labor) Projects – research activities related to actuation and sensorization strategies for both implantable medical devices and simulation devices
09-12/2021	**Visiting Research Scientist**
	Fundatiòn Tecnalia Research & Innovation – Health Division – Medical Robotics, San Sebastiàn, Spain
	Activities dealing with the development of a low-cost ergonomic robotic platform for minimally invasive surgery.
08-10/2021	**Research Activity**
	The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy
	BioSUP (Bionic Solutions for Urinary impaired People) Project – activities related to the choice of actuation systems for soft medical devices.
10/2017 – 07/2018	**Master Thesis project**
	The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy
	Design, development, realization and validation of an integrated device, for real-time monitoring of foetal head position, orientation and contact points with the birth canal, in both low- and high-fidelity childbirth simulators.
03-05/2017	**Lab Training activity**
	The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy
	Materials and Methods for the in-vitro and ex-vivo Evaluation of Fat Tissue Effects in Focused Ultrasound Surgery Applications. Abstract of the work submitted and accepted to the 4th European symposium on focused ultrasound therapy, EUFUS2017 (Leipzig, Germany) and to the 29th International Congress of the Society for Medical Innovation and Technology (iSMIT), (Turin,Italy).

Education	**10/2018 –** **07/2022**	**Ph.D. in BioRobotics** *The BioRobotics Institute, Sant'Anna School of Advanced Studies, Pisa, Italy* International Doctoral School in Biorobotics (XXXIV Ph.D. cycle) <u>Research topic</u>: "Innovative methods for safety and efficacy of USgHIFU treatments" <u>Advisors</u>: Prof. Arianna Menciassi, Dr. Andrea Cafarelli
	03/2022	**ISIPM-BASE Certification** *Istituto Italiano di Project Management (ISIPM), Rome, Italy*
	06/2021	**Enabled to the profession of Engineer by passing the Italian State Examination** *University of Pisa, Pisa, Italy*
	09/2015 – **07/2018**	**M. Sc. Bionics Engineering** *University of Pisa and Sant'Anna School of Advanced Studies, Pisa, Italy* <u>Final score</u>: 110/110 cum laude <u>Master Thesis title</u>: "Study and implementation of miniaturized sensors for pre-clinical evaluation of delivery procedure during medical training"
	09/2012 – **10/2015**	**Bachelor's Degree in Biomedical Engineering** *University of Pisa, Italy* <u>Final score</u>: 105/110 <u>Thesis title</u>: " kinematic study of a braided mesh for the development of bioinspired linear contractile actuators"
	2007 – 2012	**Diploma in Classic High School** *Liceo Classico "Pellegrino Rossi", Massa (MS), Italy* <u>Final score</u>: 97/100

Personal skills	**Languages**	<u>Mother tongue</u>: Italian

<u>Other languages</u> (*): English

Listening	B2	Speaking	B2
Reading	B2	Writing	B2

French

Listening	A1	Speaking	A1
Reading	A1	Writing	A1

Spanish

Listening	B1	Speaking	A1
Reading	B1	Writing	A1

(*) *Common European Framework of Reference for Languages.*

Skills

MATLAB, LabVIEW, LabVIEW Real Time and LabVIEW FPGA Module, C++, CAD, COMSOL, ROS – Robot Operating System

Graphical User Interface Development (QT Creator)

Certificate of KUKA LBR iiwa - Commissioning and Programming course

Knowledge on medical device certification

Chemical and polymer lab activities

Hints of Arduino, Processing, PhytonOperative Systems:

Windows, Linux.

Office Suite

Projects	[FUTURA 2020](#)
	[HIFUSK - High Intensity Focused Ultrasound Surgery based on Kuka robot](#) KUKA Innovation Award Finalist 2020

Additional activities	01-02/2016	Group project focused on implementing a neural model for audio features recognition, using Labview.
	02-03/2017	Group project on developing and implementing a vestibulo-ocular reflex (VOR) model based on spiking neural networks. Use of YARP software package, NEST simulator for spiking neural network models, iCub simulator.
	07/2017	Group project on developing and implementing a three-state amplitude myoelectric control of a one DOF hand, using the PIC18F4431 Microcontroller
Achievements & Awards	07/2021	Best Innovation Award – Surgical Robot Challenge Hamlyn Symposium 2021
	07/2021	Best Application Award – Surgical Robot Challenge Hamlyn Symposium 2021
	11/2020	[KUKA Innovation Award 2020](#) KUKA (https://youtu.be/_s5wgiRp_e4)
	07/2019	finalist in the EMBS Student Paper Competition EMBC 2019
	06/2019	Student Award 19th International Symposium of ISTU, 5th European Symposium of EUFUS

Publications and Conferences

(*) = The authors equally contributed to the paper

Morchi, L., Tognarelli, S., & Menciassi, A. (2022). A Novel Childbirth Simulator for Real-Time Monitoring of Fetal Head During the Active Phase of the Labor. IEEE Transactions on Medical Robotics and Bionics, 4(3), 720-728.

Mannella, P., Tognarelli, S., Pancetti, F., **Morchi, L**., Menciassi, A., & Simoncini, T. (2022). The use of a novel sensorized simulation platform for real-time labor progression assessment. *International Journal of Gynecology & Obstetrics*.

Mariani, A*., **Morchi, L***., Diodato, A., Tognarelli, S., & Menciassi, A. (2022). High-Intensity Focused Ultrasound Surgery Based on KUKA Robot: A Computer-Assisted Platform for Noninvasive Surgical Treatments on Static and Moving Organs. IEEE ROBOTICS AND AUTOMATION MAGAZINE, 2-16.

Palumbo, M. C., **Morchi, L**., Corbetta, V., Menciassi, A., De Momi, E., Votta, E., & Redaelli, A. (2022, April). An Easy and User Independent Augmented Reality Based

Navigation System for Radiation-Free Interventional Procedure. In 2022 International Symposium on Medical Robotics (ISMR) (pp. 1-7). IEEE.

L. Morchi, M. Gini, A. Mariani, N. Pagliarani, A. Cafarelli, S. Tognarelli, A. Menciassi, "A Reusable Thermochromic Phantom for Testing High Intensity Focused Ultrasound Technologies", *2021 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2021.

L. Morchi, A. Mariani, A. Diodato, S. Tognarelli, A. Cafarelli, & A. Menciassi, (2020). Acoustic Coupling Quantification in Ultrasound-Guided Focused Ultrasound Surgery: Simulation-Based Evaluation and Experimental Feasibility Study. *Ultrasound in Medicine & Biology*, *46*(12), 3305-3316.

L. Morchi*, A. Mariani*, A. Cafarelli, A. Diodato, S. Tognarelli, and A. Menciassi. "A Pilot Study for a Quantitative Evaluation of Acoustic Coupling in US-guided Focused Ultrasound Surgery", (*2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2019.

F. Fontana, F. Iberite, **L. Morchi**, T. Pratellesi, A. Cafarelli, L. Ricotti, "Highly controlled and usable system for Low-Intensity Pulsed Ultrasound Stimulation of Cells", *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*. IEEE, 2019.

A. Mariani*, **L. Morchi***, A. Cafarelli, A. Diodato, S. Tognarelli, and A. Menciassi. "Ultrasound-based Safety Assessment during Moving Organ Tracking Towards In Vivo Focused Ultrasound Therapy", Hamlyn Symposium 2019

L. Morchi*, A. Mariani*, A. Cafarelli, A. Diodato, S. Tognarelli, and A. Menciassi. "Quantitative Acoustic Coupling Evaluation in US-guided Focused Ultrasound Surgery", International Society of Therapeutic Ultrasound (ISTU) 2019.

M. Gherardini*, **L. Morchi***, A. Cafarelli, S. Tognarelli, A. Menciassi. "Fat Tissue Mimicking Phantom development for lesion assessment in USgHIFU applications". 29th International Congress of the Society for Medical Innovation and Technology (iSMIT). Turin, November 2017.

M. Gherardini*, **L. Morchi***, A. Cafarelli, S. Tognarelli, A. Menciassi. "Development of a fat tissue mimicking phantom for lesion assessment in USgHIFU". 4th European Symposium on Focused Ultrasound Therapy (EUFUS). Leipzig, October 2017.

11/2021	**2021 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). IEEE, 2021** *Virtual event*
11/2020	**7th International Symposium on Focused Ultrasound** *Virtual event*
07/2019	**2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC). IEEE, 2019** *Berlin, Germany* Participant as author
06/2019	**19th International Symposium of ISTU (International Society of Therapeutic Ultrasound) - 5th European Symposium of EUFUS (European Focused Ultrasound Charitable Society)** *Barcelona, Spain* Participant as author, (accepted abstract).

(*) = The authors equally contributed to the paper

	10/2017	**4th European symposium on focused ultrasound therapy, EUFUS2017** *Leipzig, Germany* Participant as author, (accepted abstract).
	09/2017	**Festival Internazionale della Robotica** *Pisa,Italy* Participant as auditor
	04/2017	**XVII congresso nazionale SIRN, "Dai confini delle neuroscienze alla neuroriabilitazione"** *Pisa, Italy* Participant as auditor
	12/2016	**"Tecnologie biomediche in riabilitazione"** *Scuola Superiore di Alta Formazione (SIAF), Volterra, Italy* Participant as auditor
	11/2015	**XXIII Congresso Nazionale della Società Italiana di Psicofisiologia (SIPF), "From segregation to integration: The complexity of human brain functions"** *IMT Institute for Advanced Studies, Lucca, Italy* Participant as auditor
Seminars and Courses	**02/2022**	**Project Management (base level)** Organized by STARGATE CONSULTING & TRAINING srl, Pisa, Italy Code 072PROTD2166036
	02/2020	**KUKA LBR iiwa - Commisioning and Programming** Authenticity code: AWa88e
	09/2018-03/2019	**"MOOC Inserm HIFU: Therapeutic Ultrasound"**, organized by Lab Tau and Focused Ultrasound Foundation *Online Course*
	10/2018	**"Creative Engineering Design – Methods in Action"**, Prof. Cesare Stefanini, Professor of the BioRobotics Institute. *The BioRobotics Institute, Pontedera, Italy*
	02/2018	**"The Bioengineering Initiative at Children's National Health System: Device Development for the Pediatric Environment: First 5 Years"**, Prof. Kevin Cleary, Technical Director, Bioengineering Initiative, Sheikh Zayed Institute for Pediatric Surgical Innovation, Children's National Medical Center, Washington, USA, *The BioRobotics Institute, Pontedera, Italy*
	10/2016	**"Targeted muscle reinnervation"**, Prof. Levi J. Hargrove. Director, Neural Engineering for Prosthetics and Orthotics Lab. Rehabilitation Institute Chicago *The BioRobotics Institute, Pontedera, Italy*
Schools	**03/2019**	**"Winter School on Therapeutic Ultrasound"**, *Ecole de Physique, Les Houches, France*

Other information	EUFUS (European Focused Ultrasound Charitable Society) Member
	IEEE (Institute of Electrical and Electronics Engineers) Student Member
	<u>12/2017</u>: Course: "Formazione generale lavoratori", *Scuola Superiore Sant'Anna, Pisa, Italy*
	<u>2014</u>: Training course on BLS-D
	Driving license, B category

In accordance with the Italian Legislative Decree no. 196/2003 on Personal Data Protection.
Date   Signature