

# MATTEO CIANCHETTI

## Curriculum Vitae et Studiorum

*Business address* The BioRobotics Institute, Scuola Superiore Sant'Anna  
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*ResearcherID* C-8480-2012  
*Scopus Author ID* 23388237000  
*Web* <https://www.santannapisa.it/en/matteo-cianchetti>

### ACADEMIC POSITIONS

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- **Assistant professor** (Ricercatore TD - ex art. 24 comma 3 lett. B, nel settore concorsuale 09/G2 - Bioingegneria, SSD ING-IND/34) at the Scuola Superiore Sant'Anna, Pisa, Italy, from June 2020.
- **Assistant professor** (Ricercatore TD - ex art. 24 comma 3 lett. A, nel settore concorsuale 09/G2 - Bioingegneria, SSD ING-IND/34) at the Scuola Superiore Sant'Anna, Pisa, Italy, from June 2012 to May 2020.
- **Post-Doc Research Assistant** (Assegno di Ricerca, SSD ING-IND/34) at the Scuola Superiore Sant'Anna, Pisa, Italy, from May 2011 to May 2012.
- **Visiting Researcher** at the Centre for Biomimetics, University of Reading, Reading, UK, from January 2010 to March 2010 under the supervision of Prof. George Jeronimidis (University of Reading).
- **Research Collaborator** at the Scuola Superiore Sant'Anna in Pisa, Italy, from April 2007 to January 2012 (several contracts).

### EDUCATION

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- **Ph. D. in Biorobotics** from the Scuola Superiore Sant'Anna in Pisa (Italy) in May 2011 (100/100 cum laude).  
*Title of the Ph. D. thesis:* "Biomimetic soft-bodied robots: design and development of an artificial muscular hydrostat".  
*Co-ordinator:* Paolo Dario (Scuola Superiore Sant'Anna, Pisa)  
*Tutor:* Prof. Cecilia Laschi (Scuola Superiore Sant'Anna, Pisa)
- **Master Degree in Biomedical Engineering (Laurea Specialistica)** from the University of Pisa (Italy) in July 2007 (110/110 with honour).
- **Bachelor Degree in Biomedical Engineering (Laurea Triennale)** from the University of Pisa (Italy) in December 2004 (110/110).
- **International schools:**
  - "Embodied Intelligence summer school", Livorno, Italy, September 20-24, 2010
  - "WSK-TNg2009" WASEDA-SSSA-KIST-TSUKUBA-NAGOYA Summer School in Autumn: "From Communication to Collaboration", Tokyo, Japan, November 2-7, 2009
  - "WSK2008" Waseda-SSSA-Kist Summer School on "Fundamentals of Biorobotics", Volterra (PI), Italy, August 31-September 5, 2008

### AWARDS

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- **Winner** for the Best Paper Award in IEEE CBS 2018 conference, October 2018.
- **Finalist** for the Surgical Robot Challenge 2016, Hamlyn Symposium, UK Robotics Week, June 2016.
- **Finalist** for Best Application Paper Award from IROS2013 conference, November 2013.
- **Winner** of the Best Demo Award from Living Machines conference, August 2013.
- **Finalist** for Best Paper in Biomimetics Award from RoBio2011 conference, December 2011.
- **Ph.D. scholarship** provided by Scuola Superiore Sant'Anna upon a competitive call, for supporting the Ph.D. programme for 3 years, from January 2008 to January 2011.

## *LANGUAGES*

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**Italian** mother tongue.

Fluent spoken and written **English**, improved abroad (United Kingdom).

## *EXPERTISE*

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Research expertise in the following fields:

- Soft Robotics, Biomimetics, Bioinspired Robotics with major in:
  - study of biological models
  - translation of natural principles into novel technological solutions
  - non-conventional soft actuation technologies (ElectroActive Polymers, Shape Memory Alloys, granular jamming and Flexible Fluidic actuators)
  - flexible and variable stiffness structures
  - soft and flexible materials (polymers like silicones and polyurethanes)

Specific computer skills:

- technical computing software: MatLab, Mathcad
- Computer Assisted Design (CAD) software: ProEngineer, Solid works
- Finite Elements Analysis (FEA) software: MARC & Mentat, Comsol, Ansys
- productivity software: Microsoft Office, Latex

Capabilities of:

- autonomous work, but also within an interdisciplinary research team
- formulation of research projects and preparation of proposals
- coordination of research teams
- collaboration with international partners
- management of EU-funded projects and preparation of technical documents
- organization of international scientific events
- dual thinking, conjugating technological and managerial contents

## *RESEARCH ACTIVITIES*

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The framework for the research activities led by Dr Matteo Cianchetti to date is Soft Robotics with focus on Soft Mechatronics for Biorobotics (also the name of the Laboratory he heads).

His research activities mainly focus on the development of soft mechatronics technologies both as enabling technologies and for specific applications in different fields. In the OCTOPUS (EU funded) project, he had the opportunity to apply the principles of bioinspired robotics, effectively translating biologically inspired concepts into artificial technologies<sup>1</sup>. At the same time, he was the technical team leader of a group of four scientists investigating how to develop a completely soft 8-arm octopus-like robot. In this context, he acquired theoretical and hands-on experience on several technologies such as ElectroActive Polymers (EAP), Shape Memory Alloys (SMA), Flexible Fluidic Actuators (FFA) and Jamming-based technologies. Other than actuation, he also explored new possibilities for soft sensing especially using smart stretchable textiles and conductive fluids.

In the last few years these technologies have demonstrated their potential in sensing and actuation, thus while working on the improvement of these investigated solutions and on the development of new enabling technologies, he spent efforts in their use in specific applications where a compliant yet effective interaction is required:

- in assistive robotics, the EU funded I-SUPPORT project aims at developing a new smart and soft arm (a soft robotic shower) that assists elderly people in executing bathing tasks (frame A);
- in surgery, within the EU funded STIFF-FLOP project, he investigated a novel generation of soft and variable stiffness surgical manipulators with unprecedented dexterity<sup>2</sup> (frame B);
- in manufacturing, innovative compliant tools for grasping and manipulation have been developed within the EU funded SMART-E project (frame C);

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<sup>1</sup> Nature video – Soft Robots (<https://www.youtube.com/watch?v=A7AFsk40NGE>)

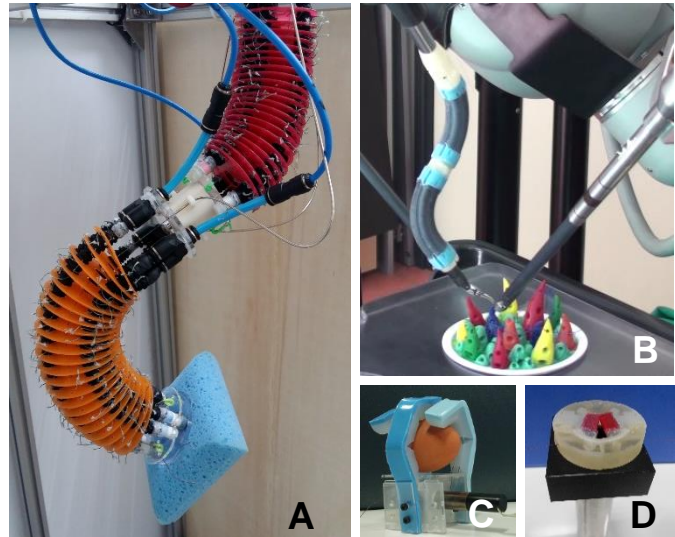
<sup>2</sup> BBC World News – How the octopus inspires surgical tools (<http://www.bbc.co.uk/programmes/p04jbqvj>)

- in the area of artificial organs, recently, he has received a grant within the EU funded Hybrid Heart project for the development of an artificial heart that relies on a hybrid combination of soft robotics, tissue engineering and wireless energy transfer.
- In the food industry, he recently received a grant from the EU, to serve as a coordinator for the SoftGrip project for the development of soft gripper for the harvesting of mushrooms.

Moreover, novel solutions for wearable robotics, realistic soft simulators of body parts (frame D) are other examples of other activities Matteo Cianchetti led or supervised where these new smart and soft-bodied technologies are being exploited.

First results in technology transfer are also visible. A big oil and gas company asked for a novel technological solution based on soft robotics to face the issue of inspection and restoration of pipelines. As a personal initiative, he is the promotor of a collaboration with 2 companies for the development of an educational kit based on soft robotics technologies.

Dr Matteo Cianchetti is also very active in the Soft Robotics international community, being directly involved in the RoboSoft Coordination Action for promoting the diffusion of the soft mechatronics technologies and for coordinating efforts among European soft-roboticists actors in developing new solutions. With the support of this consolidated network, Matteo Cianchetti contributed to the organization of two successful editions of the “Soft Robotics Week”, an event dedicated to soft robotics with international plenary speakers, summer schools and robotic competitions. More recently, he has been appointed as Local Chair for organizing the first edition of the IEEE-RAS International Conference on Soft Robotics - RoboSoft 2018 and Program Chair for RoboSoft 2022.



## TEACHING ACTIVITIES

- **Academic Year 2021-2022**
  - **Chair** of the course: “Soft Robotics Technologies” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna. 60 hours
- **Academic Year 2020-2021**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to 1 year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 60 hours
  - 1st SMART training event, 22/10/2020, title: “Fundamentals of soft robotics technologies: Soft Robots and Actuators”. 2 hours
  - Master and Doctorate programs in Automation and Robotics, Universidad Politecnica de Madrid (UPM), Spain, 30/04/2021, seminar title: “Soft robotics actuation technologies”. 1 hour
- **Academic Year 2019-2020**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to 1 year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 45 hours
- **Academic Year 2018-2019**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to 1 year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 60 hours
  - 22/11/2018 - **Invited lecture** within the course “Principles of Bionics Engineering” of the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna. Title of the lecture: “Embodiment and Morphological Computation”. 3 hours
- **Academic Year 2017-2018**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to 1 year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 60 hours

- 16/11/2017 - **Invited lecture** within the course “Principles of Bionics Engineering” of the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna. Title of the lecture: “Embodiment and Morphological Computation”. 3 hours
- **Academic Year 2016-2017**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to I year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 60 hours
  - 24/11/2016 - **Invited lecture** within the course “Principles of Bionics Engineering” of the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna. Title of the lecture: “Embodiment and Morphological Computation”. 3 hours
- **Academic Year 2015-2016**
  - **Chair** of the course: “Soft and smart materials for Bionics” within the two-year M.Sc. program in Bionics Engineering jointly held by the University of Pisa and the Scuola Superiore Sant’Anna, also delivered to I year PhD students of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 60 hours
  - 27/11/2015 - **Invited lecture** within the course “Sistemi meccatronici” of the M.Sc. program in Mechanical Engineering of the Polytechnic of Milan. Title of the lecture: “The octopus as paradigm for soft robotics”. 2 hours
- **Academic Year 2014-2015**
  - **Chair** of the course: “Innovative actuation technologies” within the PhD program in BioRobotics of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 20 hours + 10 hours of hands-on sessions
  - **Chair** of the course: “Innovative actuation technologies” within the II level Master Telecom program “Smart Solutions - Smart Communities” (2014 edition). 8 hours
  - 13/04/2015 - **Invited lecture** within the SMART-E and RoboSoft joint Summer School “Applications and Frontiers of Soft Robotics” (Livorno) for PhD student. Title of the lecture: “Flexible Fluidic Actuation and Granular Jamming - A primer”, available at: [http://www.robosoftca.eu/public\\_downloads/opensourcetools/Tutorial\\_FFA-GJ\\_0.rar](http://www.robosoftca.eu/public_downloads/opensourcetools/Tutorial_FFA-GJ_0.rar). 1 hour + 4 hours of hands-on session
- **Academic Year 2013-2014**
  - **Chair** of the course: “Innovative actuation technologies” within the PhD program in BioRobotics of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 20 hours
  - **Chair** of the course: “Innovative actuation technologies” within the II level Master Telecom program “Smart Solutions - Smart Communities” (2013 edition). 8 hours
  - 16/05/2014 - **Invited lecture** within the “Tecnologie Applicate alle Scienze Chirurgiche” course in the PhD programme on Life and Health Science of the Centro Universitario di Chirurgia Mini-Invasiva, University of Turin. Title of the lecture: “Bioinspired robotic solutions for surgery”. 1 hour
  - 21/11/2013 - **Invited lecture** within the Shanghai Lectures 2013 series. Title of the lecture: “Soft Robotics and Bioinspiration II: Soft actuator design methods”, available at: <http://robohub.org/shanghai-lectures-2013-lecture-6-soft-robotics-and-bioinspiration-ii/>. 1 hour (worldwide live broadcasting)
- **Academic Year 2012-2013**
  - **Chair** of the course: “Shape Memory Alloys actuators: from the model to the realization” within the PhD program in BioRobotics of the BioRobotics Institute of the Scuola Superiore Sant’Anna. 10 hours
- **Academic Year 2011-2012**
  - 27/06/2012 - **Invited lecture** within the “Third EMBODYi Summer School” (Roma) for PhD students. Title of the lecture: “Fundamentals on the use Shape Memory Alloys as actuators”. 1 hour
- **Academic Year 2008-2009**
  - 02/04/2009 - **Invited lecture** within the “Brown bag lectures” series for PhD students of the Artificial Intelligence Lab (AILab) of the University of Zurich. 1 hour

## **SUPERVISION AND TUTORING**

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- **Supervision** of PhD students:
  1. **Main supervisor** of Luca Arleo, Ph.D. student in Biorobotics at Scuola Superiore Sant’Anna, Title of the research program: “Study and development of a soft robotic arm with variable stiffness capabilities”, from October 2020.
  2. **Main supervisor** of Syeda Shadab Zehra Zaidi, Ph.D. student in Biorobotics at Scuola Superiore Sant’Anna, Title of the research program: “Study and development of a soft robotic gripper with variable stiffness and self-healing capabilities”, from October 2020.

3. **Main supervisor** of Lucrezia Lorenzon, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Study and development of an implantable cardiac device based on 3D printing techniques applied to soft robotics", from October 2019.
  4. **Main supervisor** of Debora Zrinscak, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Development of a bioinspired soft robotic actuation system for a total artificial heart", from October 2018.
  5. **Main supervisor** of Atta Nizamani, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Analysis, identification and set-up of technologies for developing miniature compliant actuators/effectors for biomedical applications", from October 2017 to September 2018.
  6. **Main supervisor** of Dario Lunni, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Study and development of efficient control strategy for soft robot", from October 2016.
  7. **Main supervisor** of Mariangela Manti, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "How to obtain variable stiffness mechanisms. Investigation at three different levels: Passive, Semi-Active and Active", from October 2013 to June 2017.
  8. **Main supervisor** of Vito Cacucciolo, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Cheap control and morphological computation in Muscular Hydrostats using an evolutionary computation approach", from October 2013 to March 2017.
  9. **Main supervisor** of Maurizio Follador, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Actuation mechanisms and adhesion systems for bioinspired soft robots", from January 2014 to April 2015.
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1. **Co-supervisor** of Giacomo Picardi, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Morphing body investigation on legged locomotion", from October 2016 to January 2018.
  2. **Co-supervisor** of Haider Abidi, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Soft robotics focused on surgical and assistive applications", from October 2015 to December 2018.
  3. **Co-supervisor** of Thomas George Thuruthel, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Reinforcement learning for soft robotics application", from October 2015 to January 2018.
  4. **Co-supervisor** of Taimoor Shah, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Design and development of a highly flexible arm (with Omni-directional bending and stiffness changing capabilities)", from June 2014 to June 2018.
  5. **Co-supervisor** of Yasmin Ansari, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Control of Soft Robotic Manipulators", from June 2014 to June 2018.
  6. **Co-supervisor** of Angela Grassi, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "New technologies for quantitative assessment of spontaneous movements in infancy", from March 2015 to June 2017.
  7. **Co-supervisor** of Emilio Trigili, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Development of a soft multi-joint system with variable stiffness for wearable exoskeletons", from October 2015 to June 2016.
  8. **Co-supervisor** of Iris De Falco, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "A soft variable stiffness manipulator for minimally invasive surgery", from January 2015 to January 2016.
  9. **Co-supervisor** of Giada Gerboni, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Novel actuation strategies for flexible and modular multi-DOF instruments for minimally invasive surgery", from March 2012 to October 2015.
  10. **Co-supervisor** of Tommaso Ranzani, Ph.D. student in Biorobotics at Scuola Superiore Sant'Anna, Title of the research program: "Soft mechatronic devices for minimally invasive interventions", from March 2012 to October 2014.
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- **Supervision** of M.Sc. and B.Sc. students:
    1. **Main Supervisor** of Giulia Campinoti, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2020-2021. Thesis title: "Soft arm proprioception system based on soft strain sensors"
    2. **Main Supervisor** of Giulia Beccali, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2020-2021. Thesis title: "A self-sensing inverse pneumatic artificial muscle for an actuation system of a soft robotic artificial ventricle"

3. **Main Supervisor** of Niccolò Pagliarani, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2020-2021. Thesis title: "Variable stiffness based on low-melting-point alloys in a soft robotic surgical device"
  4. **Main Supervisor** of Claudia Mariagiulia De Chirico, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2020-2021. Thesis title: "Studio ed ottimizzazione di un muscolo artificiale soft per la realizzazione di un cuore artificiale"
  5. **Main Supervisor** of Isabella Soraruf, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2020-2021. Thesis title: "Study on the effect of shoe cushioning on trail running: perception and biomechanical approach"
  6. **Main Supervisor** of Leone Costi, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2019-2020. Thesis title: "FEM-driven design and development of a bioinspired soft robotic artificial ventricle based on mechanical instabilities". Winner of the "Renato Mariani" prize of the AEIT (Italian Association of Electrical Engineering, Electronics, Automation, Computer Science and Telecommunications)
  7. **Main Supervisor** of Arianna Conte, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2019-2020. Thesis title: "Sviluppo di un simulatore biorobotico di corde vocali per la riproduzione e lo studio del segnale elettroglottografico in condizioni fisiopatologiche"
  8. **Main Supervisor** of Giorgio Bondi, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2019-2020. Winner of the "Luigi Divieti e Marisa Maranzana" prize of the GNB (National Group of Bioengineering)
  9. **Main Supervisor** of Davide Bray, M.Sc Thesis in Aerospace Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2019-2020.
  10. **Main Supervisor** of Stefano Albini, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2019-2020
  11. **Main Supervisor** of Vanni Magliola, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2018-2019.
  12. **Main supervisor** of Filomena Petrella, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2017-2018. Thesis title: "Development and test of an optimized soft ankle"
  13. **Main supervisor** of Daniele D'Accolti, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2017-2018. Thesis title: "Design and development of a magnetically driven actuation system for a soft total artificial heart"
  14. **Main supervisor** of Debora Zrinscak, M.Sc Thesis in Mechatronics Engineering (Polytechnic of Turin), a.y. 2017-2018. Thesis title: "Study and development of a bioinspired actuation system for a soft robotic total artificial heart"
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1. **Co-Supervisor** of Federico Sensoli, M.Sc Thesis in Bionics Engineering (University of Pisa and Scuola Superiore Sant'Anna), a.y. 2020-2021. Thesis title: "Study and development of machine learning methods to detect vocal fold benign lesions from audio recordings"
  2. **Co-Supervisor** of Leonardo Innocenti Camiciottoli, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2020-2021. Thesis title: "Design of a wearable system with variable stiffness for clinical applications"
  3. **Co-supervisor** of Maria Antonia Cassa, M.Sc Thesis in Chemical Engineering (Polytechnic of Turin), a.y. 2019-2020. Thesis title: "Development of an innovative electrically-conductive biomaterial for applications in Soft Robotics"
  4. **Co-supervisor** of Luca Arleo, M.Sc Thesis in Mechanical Engineering (Polytechnic of Bari), a.y. 2019-2020. Thesis title: "Soft robotics: additive manufacturing of multidirectional manipulator"
  5. **Co-supervisor** of Cecilia Carapezza, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2017-2018. Thesis title: "Study and development of a soft modular device to assist locomotion of tethered endoscopes"
  6. **Co-supervisor** of Giovanni Tarantino, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2017-2018. Thesis title: "Progettazione e realizzazione di un dispositivo robotico soft per endoscopia gastrica minimamente invasiva"
  7. **Co-supervisor** of Cristina Scalas, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2015-2016. Thesis title: "Studio e sviluppo delle tecnologie di attuazione per la realizzazione di un manipolatore robotico soft per assistenza agli anziani"
  8. **Co-supervisor** of Elisabetta Surace, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2015-2016. Thesis title: "Design e sviluppo di un elettropalatografo per la valutazione dell'articolazione della parola realizzato con materiali piezoresistivi flessibili"

9. **Co-supervisor** of Alberto Merlo, M.Sc Thesis in Mechanical Engineering (Polytechnic of Milan), a.y. 2015-2016. Thesis title: "Studio di un attuatore SMA ad elevate prestazioni"
10. **Co-supervisor** of Emilio Trigili, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2014-2015. Thesis title: "Study and development of a soft semi-active rotational joint for wearable robotics"
11. **Co-supervisor** of Alessandro Rossi, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2013-2014. Thesis title: "Studio di un sistema di attuazione con tecnologie di soft robotics per applicazioni endoscopiche"
12. **Co-supervisor** of Viviana Aprile, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2013-2014. Thesis title: "Study and realisation of an actuators system based on electroactive polymers (EAPs)"
13. **Co-supervisor** of Giovanni Rateni, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2013-2014. Thesis title: "Design and development of a Soft Robotic instrument for manipulation in Minimally Invasive Surgery"
14. **Co-supervisor** of Mariangela Manti, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2012-2013. Thesis title: "Modello teorico e sperimentale della laringe come simulatore del funzionamento fisiologico"
15. **Co-supervisor** of Alessia Licofonte, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2010-2011. Thesis title: "Sensorization of continuum robots for reconstructing spatial configuration: theoretical model and experimental validation on a robotic prototype"
16. **Co-supervisor** of Maria Elena Giannaccini, M.Sc Thesis in Biomedical Engineering (University of Pisa), a.y. 2009-2010. Thesis title: "Implementazione di tecniche di controllo bioispirate per la realizzazione di pattern di movimento tipici del polpo (*Octopus vulgaris*) su una piattaforma robotica"

- **Internees:**

1. Paris Oikonomou (National Technical University of Athens (NTUA), Greece), within the TERRINET project framework (EU funded project). Internship topic: "Dynamic Motion Generation on Soft-Robotic Manipulator", from 06/11/2019 to 15/11/2019
2. Burcu Seyidođlu (Bođaziđi University, Turkey), within the TERRINET project framework (EU funded project). Internship topic: "Testing of growing soft robot control algorithm on STIFF-FLOP soft manipulator", from 22/07/2019 to 05/08/2019
3. Maria Antonia Cassa (Politecnico di Torino, Italy). Internship: "Testing di un elastomero conduttivo a base di PEDOT:PSS per rendere elettricamente conduttiva un corda vocale artificiale", from 05/10/2019 to 04/12/2019
4. Luca Arleo (Politecnico di Bari, Italy). Internship: "Apprendimento delle principali geometrie utilizzate nella Soft Robotics, in ambito assistenziale e chirurgico, al fine di adattare le stesse a metodi di produzione additiva dei diversi componenti e in particolare di valutare le propriet  dei materiali impiegabili", from 08/07/2019 to 07/12/2019
5. Antonio L pez D az del Campo (University of Castilla-La Mancha (UCLM), Spain). Internship: "Hydrogels for soft robotics", from 09/07/2018 to 30/09/2018
6. Matteo De Benedetti (University of Pavia, Italy). Internship topic: "Introduction to Model-free Reinforcement Learning for control of Soft Robots", from 13/03/2017 to 24/03/2017
7. Elisa Pavarino (IUSS Pavia, Italy). Internship topic: "Fabrication and experimental evaluation of a soft manipulator based on cable driven actuators and a variable stiffness system", from 06/03/2017 to 17/03/2017
8. Narimene Trichine (Khalifa University, Abu Dhabi). Internship topic: "A piece-wise constant curvature model for describing the behaviour of the I-SUPPORT robotic system", from 19/05/2016 to 15/07/2016
9. Whitney Crooks (Tuft University, Boston). Internship topic: "Soft robots fabrication techniques", from 02/05/2016 to 27/05/2016
10. Kotaro Fukui (Waseda University, Tokyo). Internship topic: "Investigation for a Squeezing Mechanism", from 01/07/2009 to 15/12/2009

## EDITORIAL ACTIVITIES

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- Section **Editor-in-Chief** for the MDPI Actuators journal since 2020
- **Associate editor** for:
  - the IEEE Robotics and Automation Letters since 2018.
  - the international journal Frontiers in Robotics and AI (specialty section on Soft Robotics) since 2016.
  - the IEEE International Conference on Robotics and Automation (ICRA 2020, 2019, 2017, 2016).
  - the IEEE International Conference on Soft Robotics (RoboSoft 2020, 2019, 2018, 2017).

- the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2013).
- **Guest editor** for:
  - MDPI Actuators Special Issue Topic: TBD (2022)
  - Frontiers in Robotics and AI, Research Topic: “Novel Designs for Soft Robot Arms” (2020).
  - PlosONE collection on “Open Soft Robotics Research” (2020).
  - SAGE International Journal of Advanced Robotics, Special Issue: “Soft Robotics Interacting with the Real World” (2016).
  - Frontiers in Robotics and AI, Research Topic: “At the Frontiers of Soft Robotics: Lessons Learnt from the RoboSoft Grand Challenge” (2016).
- **Other** editorial activities:
  - Editor for the book "Soft Robotics: Trends, Applications and Challenges" Proceedings of the Soft Robotics Week, April 25-30, 2016, Livorno, Italy - Series: Biosystems & Biorobotics, Vol. 17, Springer, online since September 2016.
  - Review Editor for Frontiers in Robotics and AI
  - Review Editor for Frontiers in Bioengineering and Biotechnology
- **Peer reviewer** on a regular base for international journals: *AAAS Science Robotics*, *Elsevier Robotics and Autonomous Systems*, *Elsevier Sensors and Actuators A*, *Elsevier Materials Today*, *Frontiers in Bioengineering and Biotechnology*, *Frontiers in Robotics and AI*, *Hindawi Applied Bionics and Biomechanics*, *IEEE Robotics and Automation Magazine*, *IEEE Robotics and Automation Letters*, *IEEE Transactions on Industrial Electronics*, *IEEE Transactions on Robotics*, *IEEE/ASME Transactions on Mechatronics*, *IEEE/ASME Transactions on Biomedical Engineering*, *IoP Bioinspiration & Biomimetics*, *IoP Smart Materials and Structures*, *Mary Ann Liebert Soft Robotics*, *MDPI Actuators*, *MDPI Energies*, *MDPI Applied Sciences*, *Nature Scientific Reports*, *PNAS*, *Royal Society Journal of the Royal Society Interface*, *RSC Soft Matter*, *Sage Advances in Mechanical Engineering*, *Springer Biomedical Microdevices*, *Springer International Journal of Intelligent Robotics and Applications*, *Wiley Advanced Materials*, *Wiley Advanced Materials Technologies*, *World Scientific Journal of Medical Robotics Research*, *World Scientific International Journal of Humanoid Robotics*.
- **Peer reviewer** on a regular base for international conferences: *IEEE International Conference on Robotics and Automation (ICRA)*, *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, *IEEE Engineering in Medicine and Biology International Conference (EMBC)*, *IEEE International Conference on Biomedical Robotics and Biomechatronics (BioRob)*, *IEEE International Conference on Soft Robotics*, *Robotics: Science and Systems (RSS)*.

## SCIENTIFIC RESPONSIBILITIES

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- **Head** of the “Soft mechatronics of Biorobotics” Lab of the BioRobotics Institute of the Scuola Superiore Sant’Anna since 2012.
- **Member of the “Commissione Elettorale Unica”** of Scuola Superiore Sant’Anna from 9/10/2020 to 8/10/2021.
- **Member of the review panel** for PhD defences at University of Leeds, University of Genova and Italian Institute of Technology, University of Salford, EPFL.
- **Member of the review panel** for the central self-governing research funding organisation for science and research in Germany (Deutsche Forschungsgemeinschaft, DFG - <http://www.dfg.de/en/index.jsp>).
- **External remote reviewer** for the European Research Council (Consolidator programme).
- **External remote reviewer** for the Swiss National Science Foundation (the Switzerland’s foremost institution in the promotion of scientific research - <http://www.snf.ch/en/theSNSF/Pages/default.aspx>).
- **External remote reviewer** for The Estonian Research Council (ETAg) in Mobilitas Pluss postdoctoral grant applications (researcher mobility programme co-funded by the European Regional Fund - <http://www.etag.ee/en/funding/programmes/mobilitas-pluss/>).
- **External remote reviewer** for the Netherlands Organisation for Scientific Research, NWO - <https://www.nwo.nl/en/>
- **External remote reviewer** for the Research Foundation Flanders (Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO - <http://www.fwo.be/en/>).
- **External remote reviewer** for the Austrian Science Fund (Fonds zur Förderung der wissenschaftlichen Forschung, FWF - <https://www.fwf.ac.at/en/>)
- **External remote reviewer** for the French National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale, Inserm - <https://www.inserm.fr/>)



- **External remote reviewer** for the Czech Science Foundation (<http://www.gacr.cz/en/>)
- **Principal Investigator** (for SSSA) of the AlnCP project, Research and Innovation Action (RIA), funded by the European Commission in the HORIZON HLTH 2021-DESEASE-04, under contract 101057309, total budget € 6.31 million (group budget: 525k€), from June 2022 to May 2027.
- **Principal Investigator (project coordinator)** of the SoftGrip project, Research and Innovation Action (RIA), funded by the European Commission in the H2020 ICT-47-2020, under contract 101017054, total grant € 3.00 million (group budget: 642k€), from January 2021 to December 2023.
- **Principal Investigator** (for SSSA) of the SMART “Soft, Self-responsive, Smart MAterials for RoboTs” project, funded by the European Commission in the H2020 Marie Skłodowska-Curie action ITN-2019, under contract 860108, total grant € 3.98 million (group budget: 523k€), from March 2020 to February 2024.
- **Principal Investigator** (for SSSA) of the HybridHeart project, Research and Innovation Action (RIA), funded by the European Commission in the H2020 ICT-FET Open Programme, under contract 767195, total grant € 3.04 million (group budget: 454k€), from November 2017 to October 2022.
- **Personal contribution** to the formulation, proposal preparation, and accomplishment of research projects on Soft Robotics:
  - the I-SUPPORT Research and Innovation Action (RIA) funded by the European Commission in the HEALTH Programme under contract 643666, total grant €3.56 million, from March 2015 to February 2018.
  - the RoboSoft Coordination Action (CA) “A Coordination Action for Soft Robotics”, funded by the European Commission in the ICT-FET Programme under contract 619319, total grant €952 thousand, from October 2013 to September 2016.
  - the SMART-E Marie Curie ITN “Sustainable Manufacturing through Advanced Robotics Training in Europe”, funded by the European Commission in the PEOPLE Programme under contract 608022, total grant €3.95 million, from November 2013 to October 2017.
  - the STIFF-FLOP Integrating Project (IP) “STIFFness controllable Flexible and Learn-able manipulator for surgical OPerations”, funded by the European Commission in the ICT-Challenge 2 Programme “Cognitive Systems and Robotics” under contract 287728, total grant €7.35 million, from January 2012 to December 2015.
  - the OCTOPUS Integrating Project (IP) “Novel Design Principles and Technologies for a New Generation of High Dexterity Soft-bodied Robots Inspired by the Morphology and Behaviour of the Octopus”, funded by the European Commission in the ICT-FET Programme “Embodied Intelligence”, under contract 231608, total grant €9.74 million, from February 2009 to January 2013.
- **Responsible** representing SSSA in the Board of Directors of the “Consorzio Interuniversitario Istituto Nazionale per le Ricerche Foniatiche (I.N.F.R.) - G. Bartalena”.
- **Responsible** of the industrial collaboration with RoboTech srl and GREAT Robotics within the regional project RES “Robotica Educativa Soft” to combine the know-how possessed by the partners to create a new educational product inspired by the principles of soft robotics, total grant 54k€ (March 2018 – February 2020).
- **Responsible** of the industrial collaboration with STMicroelectronics and SAES Getters within the regional project “SMAtt” for the development of an actuation device based on Shape Memory Alloys, total grant 60k€ (September 2012 – September 2014).
- **Organizer** of the Workshop “Morphological computation through physical adaptation of soft robots”, at the IEEE International Conference on Soft Robotics (RoboSoft 2019), Seoul, Korea, April 14-18, 2019
- **Organizer** of the “Corso di aggiornamento professionale - SIAF (Società Italiana di Audiologia e Foniatria): la laringologia nel terzo millennio”, Pisa, Italy, November 24, 2018
- **Organizer** of the Workshop “Continuum and Soft Robots for medical interventions” at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2018), Madrid, Spain, October 1-5, 2018
- **Organizer** of the two editions of the Soft Robotics Week (2015 and 2016), event that annually gathers the most prominent international actors on Soft Robotics and includes the plenary meeting of the RoboSoft community; a summer school for PhD students and a Challenge for soft robots.
- **Organizer** of the Workshop “New Frontiers and Applications for Soft Robotics” at the IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2015), Hamburg, Germany, September 28 – October 03, 2015
- **Chair** of the Organized Session “Embodied Intelligence: Embodied Soft Robots” at the IEEE/RAS International Conference on Robotics and Automation (ICRA 2012), St. Paul, Minnesota, USA, May 14-18, 2012

- **Chair** of the Organized Sessions “Smart materials and actuators for Soft Robotics” at the IEEE/RAS International Conference on Biomedical Robotics and Biomechatronics (BioRob 2012), Rome, Italy, June 24-28, 2012
- **Technical Program Chair** member for the 2017 International Conference on Materials Science and Engineering Application (ICMSEA2017), Nanjing, China, April 21-23, 2017
- **Program Committee** member for the "Multi-Learn-2017" workshop at EUSIPCO'17, Kos Island, Greece, Sept 2, 2017
- **Scientific committee** member of the SMART-E final conference (in collaboration with Festival Internazionale della Robotica), Pisa, Italy, September 7-8, 2017
- **Local Arrangement Chair** of the IEEE RoboSoft 2018 conference, Livorno, Italy, April 24-28, 2018
- **Workshop Co-Chair** of the IEEE RAS Seasonal School on Rehabilitation and Assistive Technologies based on Soft Robotics, 14-18/06/2021
- **Workshop Chair** of the IEEE RoboSoft 2019 conference, Seoul, Korea, April 14-18, 2019
- **Program Chair** of the IEEE RoboSoft 2022 conference, Edinburgh, UK, April 4-8, 2021
- **Chair** of the IEEE TC on Soft Robotics
- **Co-Chair** of I-RIM Soft Robotics Working Group

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## ACADEMIC ROLES, MEMBERSHIPS AND QUALIFICATIONS

- **Member** of the Faculty Board (Collegio dei Docenti) of the BioRobotics Institute of the Scuola Superiore Sant'Anna since June 2012.
- **Member** of Boards of the Scuola Superiore Sant'Anna for PhD defences, admission to undergraduate and PhD positions, selections for post-doc fellowships and collaborators, regularly since June 2012.
- **Member** of International scientific Societies:
  - IEEE Member (www.ieee.org) since 2005
  - Member of the IEEE Robotics & Automation Society (RAS) since 2005
  - Member of the IEEE Engineering in Medicine and Biology Society (EMBS) since 2005 (scientific secretary of the EMBS TC on BioRobotics in 2015)
- **Qualification** “Abilitazione Scientifica Nazionale” (ASN), national scientific qualification to function as associate professor in Italian Universities, granted by MIUR on 30/03/2017.
- **Qualification** “Abilitazione alla professione di Ingegnere Industriale” granted by MIUR on 03/07/2012.

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## DISSEMINATION

- **Oral presentations to international conferences:**
  - IEEE International Conference on Soft Robotics (RoboSoft 2021), 14/04/2021, virtual event, title: “A biorobotic simulator of vocal folds for the reproduction and analysis of electroglottographic signals”.
  - IEEE International Conference on Soft Robotics (RoboSoft 2018), 25/04/2018, Livorno – Italy, title: “Preliminary experimental study on variable stiffness structures based on fiber jamming for soft robots”
  - Surgical Robot Challenge 2016 of the Hamlyn Symposium within the UK Robotics Week 2016, 25/06/2016, London – UK, title: “Soft Laparoscopic Tool for MIS”
  - International Symposium on Adaptive Motion of Animals and Machines (AMAM 2015), 24/07/2015, Cambridge – MA, title: “Cephalopod-inspired soft robots - design criteria and modeling frameworks”
  - IEEE Conference on Biomedical Robotics and Biomechatronics (BioRob 2012), 25/06/2012, Roma – Italy, title: “Sensorization of continuum soft robots for reconstructing their spatial configuration”
  - IEEE Conference on Robotics and Automation (ICRA 2012), 17/05/2012, St. Paul – MN, title: “Design and development of a soft robotic octopus arm exploiting embodied intelligence”
  - IEEE Conference on Intelligent and Robotic Systems (IROS 2013), 05/11/2013, Tokyo – Japan, title: “STIFF-FLOP Surgical Manipulator Mechanical design and experimental characterization of the single module”
  - International workshop on bio-inspired robots, 08/04/2011, Nantes – France, title: “Novel Design Principles for a Biomimetic Soft-Robot based on the In Vivo Characterization of the Morphology and Mechanics of Octopus Arm”
  - IEEE Engineering in Medicine and Biology Conference (EMBC 2007), 23/08/2007, Lyon – France, title: “Biorobotic Investigation on the Muscle Structure of an Octopus Tentacle”

- **Invited lectures to international conferences and workshops:**
  - European Robotics Forum, “New Horizon Project” session, 14/04/2021, virtual event, title: “SoftGrip project”.
  - Flash talk in the Breakout session “Kinds of Intelligence” in the 2021 International Workshop on Embodied Intelligence, 14/03/2021, title: “Embodied intelligence for resilient soft robots”
  - 2<sup>nd</sup> INM mini-symposium “Materials for the Digital Environment”, INM-Leibniz Institute for New Materials, 06/10/2020, title: “Soft mechatronics for the phygital environment”.
  - IEEE International Conference on Soft Robotics (RoboSoft 2019), 15/04/2019, Seoul – Korea, title: “Soft Robotics Mechanisms: the fascinating role of fibers” (Keynote Speaker)
  - International Workshop for Soft Artifacts, 04/12/2018, Tokyo – Japan, title: “The octopus as a model for building soft robots”
  - International Italy - Japan Workshop “The First Robots: Leonardo da Vinci and history and future of mechanisms”, 03/12/2018, Tokyo – Japan, title: “Nature as an ancient yet modern source of inspiration”
  - International Symposium of the Material Research Society (MRS 2018 – fall meeting), 26/11/2018, Boston – USA, title: “Soft materials and soft robotics for future robot abilities and applications”
  - International Workshop on “Robotics for Man and Biosphere”, 22/06/2018, Brussels – Belgium, title: “Life-inspired soft robotics for life-applied technologies”
  - IEEE International Conference on Soft Robotics (RoboSoft 2018) – Workshop on towards Soft Perceptive Robots: From Robotic and Biologically-Inspired Solutions, to Soft Sensing Technologies”, 24/04/2018, Livorno – Italy, title: “Stretchable sensors for manipulators working in wet conditions: a “user” perspective”
  - International Conference on Modern Materials and Technologies (CIMTEC 2016), 09/06/2016, Perugia – Italy, title: “An octopus-inspired robot (and how it can change robotics paradigms)”
  - International Conference NanotechITALY 2015, 25/11/2015, Bologna – Italy, title: “Soft Robots Manufacturing (Key Enabling Technologies and Open Challenges)”
  - IEEE International Conference on Advanced Robotics (ICAR 2015) – Workshop on Bioinspired Soft Robotics, 31/07/2015, Istanbul – Turkey, title: “How to build a soft robot? learn from an octopus”
  - International Workshop on Human Friendly Robotics, 24/10/2014, Pisa – Italy, title: “Soft Mechatronics for Human-Friendly Robotics”
  - IEEE International Conference on Robotics and Automation (ICRA 2014) – Workshop on Soft Robots, 05/06/2014, Hong Kong – China, title: “The OCTOPUS project as an incubator of Soft Robotics technologies”
  - IEEE and KROS Conference on Ubiquitous Robots and Ambient Intelligence (URAI 2013), 01/11/2013, Jeju – Korea, title: “The octopus as paradigm for soft robotics”
- **Invited lectures to national conferences:**
  - XXXVIII Congresso Nazionale della Società Italiana di Audiologia e Foniatria, 11/11/2021, Torino – Italy. Talk title: “Una sfida in campo foniiatrico: un laboratorio di bioingegneria e clinico per costruire una laringe artificiale”
  - XXXVII Congresso Nazionale della Società Italiana di Audiologia e Foniatria, 08/11/2019, Modena – Italy. Talk title: “Studio finalizzato allo sviluppo di una laringe biorobotica con un piano cordale funzionalizzato”
  - XLVIII Congresso della Società Italiana di Foniatria e Logopedia, 19/06/2014, Rome, title: “La Biorobotica per un modello del piano glottico”
  - XXXIV Congresso Nazionale della Società Italiana di Audiologia e Foniatria, 18/10/2013, Venice, title: “La biorobotica per un modello fisico della laringe”