

Manuel Giuseppe Catalano

PHD in Robotics and Bioengineering | M.Sc. in Mechanical Engineer | B.Sc. in Mechanical Engineer

Age: 35 years
Marital Status: single

Personal Contacts

Via Carlo del Prete 19
50126 Pisa, Italy
+393286158668
manuel.catalano@gmail.com
l.com

Work Contacts

Istituto Italiano di
Tecnologia - Advanced
Robotics
Via Morego, 30
16163 Genova, Ge,
Italy
manuel.catalano@iit.it

Collaborator

Centro di ricerca "E.
Piaggio"
Faculty of Engineering
University of Pisa
Largo Lucio Lazzarino
1
56126, Pisa, PI
Italy

manuel.catalano@centropiaggio.unipi.it

Research Interests

Robotics; Robot actuation; Human-Robot Interaction; Humanoid Robots; Advanced mechanical systems; Robotic Hands; Robotic Feet; Prosthetic Hands; Robotics for Rehabilitation; Control of Robotics Systems;

Education

PhD in Robotics

| 2010-2013

*Interdepartmental Research Center "E. Piaggio"
Faculty of Engineering - University of Pisa, Via Diotisalvi 2, Pisa, PI, Italy*

*Italian Institute of Technologies
Via Morego, 27, Genova, Italy*

Advisors: Prof. Antonio Bicchi - bicchi@centropiaggio.unipi.it

Nikolaos Tsagarakis - nikos.tsagarakis@iit.it

Darwin Caldwell - Darwin.Caldwell@iit.it

*Major Areas: Robotics Actuation: development of Variable Stiffness Actuators;
Robotic and Prosthetic Hands, Humanoid and legged Robots*

M.Sc in Mechanical Engineering

| 2006-2008

Specialisation in Mechanical Design

Faculty of Engineering - University of Pisa, Via Diotisalvi 2, Pisa, PI, Italy

Advisors: Antonio Bicchi - bicchi@centropiaggio.unipi.it

Major Areas: Mechanical Design, dynamics and static. Fluid dynamics. Production and Technological problems in mechanical engineering. Physics and Mathematica.

Overall GPA: 107 (out of 110)

B.Sc. in Mechanical Engineering

| 2000-2006

Faculty of Engineering - University of Pisa, Via Diotisalvi 2, Pisa, PI, Italy

Advisors: *Prof. Marco Beghini and Prof. A. Barone*

Overall GPA: 96 (out of 110)

 **Work Experience**

Researcher

| 2016-current

*Istituto Italiano di Tecnologia - Advanced Robotics
Via Morego 30, 16163, Genova, Italy*

Study, mechanical design and control of Variable Impedance Actuator, Robotic and Prosthetic Hands; advanced design and control of complex robotic systems and Humanoid Robots.

POST DOC

| 2013-2016

*Istituto Italiano di Tecnologia - Advanced Robotics
Via Morego 30, 16163, Genova, Italy*

Study, mechanical design and control of Variable Impedance Actuator, Robotic and Prosthetic Hands; advanced design and control of complex robotic systems and Humanoid Robots.

RESEARCH AFFILIATE

| 2014-current

*MAYO CLINIC - ASSISTIVE AND RESTORATIVE TECHNOLOGY
Rochester, Minnesota, United States of America*

Collaboration in the development of new Prosthetic devices for upper limb loss.

RESEARCH AFFILIATE

| 2013-current

*Centro di Ricerca E. Piaggio - University of Pisa**Pisa, Italy*

Collaboration in the development of new actuation devices and end-effector systems, with application in industrial, service robotics and rehabilitation scenarios.

PhD Student

| 2010-2013

*Centro di Ricerca "E. Piaggio" - University of Pisa, Pisa, PI, Italy**Istituto Italiano di Tecnologia - Advanced Robotics, Genova, Italy*

Robotics Actuation: development of Variable Stiffness Actuators; Robotic and Prosthetic Hands, Humanoid and legged Robots

RESEARCH FELLOW

| 2008-2010

*Interdepartmental Research Center "E. Piaggio"**Faculty of Engineering - University of Pisa, Via Diotisalvi 2, Pisa, PI, Italy*

Study, mechanical design and control of Variable Impedance Actuator and design and control of robotic systems.

 **Editor**

IEEE Robotics and Automation Letters

Associate Editor

| 2015 - current

IEEE International Conference on Rehabilitation Robotics

Associate Editor

| 2017 - current

IEEE 25th Mediterranean Conference on Control and Automation

Associate Editor

| 2017 - current

IEEE RAS/EMBS International Conference on Biomedical Robotics and Biomechanics

Associate Editor

| 2018 - current

IEEE/RSJ International Conference on Intelligent Robots and Systems

Associate Editor

| 2018 - current

Patents

2016 UA2016A003457, **Mano Artificiale**, A. Bicchi, M. G. Catalano, G. Grioli, C. della Santina, C. Piazza, M. Garabini

2015 PCT/IB2016/056468, **Underactuated robotic hand**, A. Bicchi, M. G. Catalano, G. Grioli, C. della Santina, C. Piazza, M. Garabini

2015 IT102015000068000, **Mano Robotica**, A. Bicchi, M. G. Catalano, G. Grioli, C. della Santina, C. Piazza, A. Brando

2010 EP10188315.5, **Variable pliability actuator**, A. Bicchi, M. G. Catalano, G. Grioli, M. Garabini

2010 US9227328 (B2), **Variable pliability actuator**, A. Bicchi, M. G. Catalano, G. Grioli, M. Garabini

2009 ITPI20110057 (A1), **Meccanismo elastico non lineare a caratteristica programmabile**, A. Bicchi, M. G. Catalano, G. Grioli, M. Garabini

International Research Projects

International Projects -

Participation or Work Package Leader

| 2008 - current

- **THING:** Intra-Logistics with Integrated Automatic Deployment: safe and scalable fleets in shared spaces
- **ILIAD:** Intra-Logistics with Integrated Automatic Deployment: safe and scalable fleets in shared spaces
- **SoftPro:** Synergy-Based Open-Source Foundations and Technologies for Prosthetics and rehabilitation
- **ERC SoftHand Pro-H**
- **SOMA:** Soft-bodied intelligence for Manipulation
- **Walk-Man:** Whole Body Adaptive Locomotion and Manipulation
- **ERC SoftHand:** a theory of soft synergies for a new generation of artificial hands
- **INAIL-IIT:** Rehabilitation Technologies [2014]
- **NIH-R21 founded project:** Study of Prosthetic Hands
- **MAYO Clinic founded project:** Study of Prosthetic Hands
- **SAPHARI:** Safe and Autonomous Physical Human-Aware Robot Interaction
- **VIATORS:** Variable Impedance Actuation systems embodying advanced interaction behaviors
- **PHRIENDS:** Physical Human-Robot Interaction: Dependability and Safety
- **THE:** The Hand Embodied
- **ROBLOG:** Cognitive Robot For Automation of Logistic Processes
- **PACMAN:** Probabilistic and Compositional Representations of Objects for Robotic manipulation
- **WEARHAP:** Wearable Haptics for Humans and Robots
- **MAGNA Closures:** projects in collaboration with
- **HANDS.DVI:** an ECHORD++ European Clearing House for Open Robotics Development

Invited Talks

2017, Invited Speaker, **Disaster Response Robots**, ICRA 2017, Singapore
2017, Invited Speaker, **Shirley Ryan Ability Lab, Chicago, IL, USA**
2017, Invited Speaker, **Space Center Houston (NASA)**, Houston, TX, USA
2017, Invited Speaker, **Fondazione Santa Lucia**, Rome, Italy
2016, Invited Speaker, **USL Toscana Nord-Ovest**, Massa, Italy
2012, Invited Speaker, **Nakamura Lab**, Tokyo University, Tokyo, Japan

Main robotics systems developed

Actuators

VSA-HD: Variable Stiffness Actuator for high-end robots

VSA-Cube: Variable Stiffness Actuator for low-cost robots

qbmove: low cost, variable impedance actuator for market exploitation

Walk-Man Actuation Unit: Series Elastic Actuator for high-end Humanoid and Robotic applications

Robotics End-Effectors

PISA/IIT SoftHand: for robotic applications (e.g. Coman Humanoid Robot)

Walk-Man SoftHand: customisation for the Walk-Man Humanoid Robot

SoftHand 2: Soft Robotic Hand implementing two postural synergies

SoftHand-D: Prosthetic hand implementing dynamic synergies

SoftGripper: derivation of Pisa/IIT SoftHand for industrial applications

Velvet Fingers: an industrial gripper with enhanced grasping capabilities

Soft Foot: compliant passive robotic foot

Prosthetic Hands

SoftHand Pro: Prosthetic Hand

SoftHand Pro-H: Hybrid Prosthetic Hand

SoftHand 2 Pro: Soft Prosthetic Hand implementing two postural synergies

Haptic Devices

CUFF: Clenching Upper-Limb Force Feedback

Stretch-Pro: delivery of proprioceptive haptic feedback for artificial hands

Hap-Pro: delivery of proprioceptive haptic feedback for artificial hands

Sensing Devices

Thimble Sense: wearable tactile sensor

ExoSense: wearable exoskeleton for had posture reconstruction

SoftGlove: IMU based glove for robots and humans

Humanoid Robots

Walk-Man Humanoid Robots: actuation units, lower body and hands

qbmate: low-cost and affordable robotic platform, humanoid lower and upper body.

EGO: a soft humanoid platform for physical interaction and teleoperation

Robotic Manipulators

VSA-Soft Delta

VSA-SoftArm

Casting Manipulator

Robots

VSA-Soft Snake

2-DOF Helicopter

David: Rover and Manipulator for the ESA lunar robotics challenge

Awards and Accomplishments

Best European PhD Thesis - Georges Giralt Award

| 2014

Rovereto, Italy

Winner

“Soft Robotics: Design for Simplicity, Performance, and Robustness of Robots for Interaction with Humans”

ISPO Blatchford Award 2017

| 2017

Cape Town, South Africa

Shortlist of six finalists

“SoftHand Pro”

Italian Orthopaedic Award - Category "Projects"

| 2016

Bologna, Italy

Finalist

"SoftHand. Soft. Smart. Robust."

Conferences

AIM 2017 - Best Paper Award

| 2017

Munich, Germany

Finalist

"Design and Characterisation of a Novel High-Compliance Spring for Robots with Soft Joints"

WORLD HAPTICS 2017 - Best Paper Award

| 2017

Munich, Germany

Finalist

"The Rice Haptic Rocker: skin stretch haptic feedback with the Pisa/IIT SoftHand."

HUMANOIDS 2015 - Best Interactive Paper Award

| 2015

Seoul, Sud Korea

Winner

"Dexterity augmentation on a synergistic hand: the Pisa/IIT SoftHand+"

HUMANOIDS 2012 - Best Paper Award

| 2012

Osaka, Japan

Winner

"Adaptive Synergies for a Humanoid Robot Hand"

IROS 2012 - Best Jubilee Video Award

| 2012

Vilamura, Portugal

Winner

“Variable Impedance Actuators: Moving the Robots of Tomorrow”

Competitions

IROS 2016: Robotic Grasping and Manipulation Competition

| 2016

Daejeon, Korea

Winner, Hand in Hand Track

The challenge was held in October 2016 and i was responsible for the mechanical design and development of the Pisa/IIT SoftHand.

CYBATHLON 2016: Championship for Athletes with Disabilities

| 2016

Zurich, Switzerland

5th place, Powered Arm Prosthesis Race

The challenge was held in October 2016 and i was responsible for the mechanical design and development of the SoftHand Pro-H. I was also team member of the Official Team. The SoftHand Pro-H, in the second run of the competition, accomplished all the six tasks of the challenge. Only two team were able to accomplish all the tasks.

DARPA Robotics Challenge 2015 - Finals

| 2015

Pomona, California, USA

17th place

The challenge was held in June 2015 and i was responsible for the mechanical design of the main actuation units, lower body and robotic hands. I was also team member of the Field Team during the official Challenge. The Walk-Man team arrived in 17th position in the challenge and the project received broad media attention.

ESA Lunar Robotics Challenge Competition

| 2008

Tenerife, Spain

2nd place

The challenge was held in October and the student was responsible for coordinating the Mechanical development activities of the team. The Università di Pisa arrived in second position in the challenge and the project received broad media attention.

Entrepreneurship

[E1] **Co-Founder of “Natural Machine Motion Initiative”**, [2012], an Open-Source community and platform for SoftRobotics. Initiative supported and Hosted by Fondazione Istituto Italiano di Tecnologia e Centro di Ricerca “E. Piaggio”- Università di Pisa.

“Natural Motion Machine Initiative (NMMI) is a community tool built, used, and maintained by researchers, industrial partners and enthusiasts to support the philosophy of a joint and open development of Natural Motion.

Nobody knows exactly how robots of the future will be. However, we all know they will not be like the heavy, bulky, rigid machines dangerously moving around in old- fashioned industrial plants.

Robots of the next generation will be physically compliant and adaptable machines closely interacting with humans. They will be moving safely, smoothly and efficiently – in other words robots will be soft!

Natural Machine Motion is "the third way" of Robotics: it is a principle to design, realize and control simple, affordable, yet smooth, strong, and accurate machines. Just like natural muscles, soft actuators can store an release energy, absorb impacts, regulate stiffness, and enable the design of adaptable machines that can face the challenges of tomorrow.”

[E2] **Co-founder of “qrobotics s.r.l.”**, [2012], a spin-off company of Fondazione Istituto Italiano di Tecnologia e Centro di Ricerca “E. Piaggio”- Università di Pisa.

“Founded in 2011, qrobotics Srl is a high-tech company that produces innovative soft robotic muscles and robotic hands that exploit soft robotics technologies. Soft robotics technologies revolutionize the way robots move

because they implement the natural principles of motion control in order to create machines whose motion is smooth, safe, and efficient. State-of-the-art technologies, including fully open-source design, rapid manufacturing techniques, new robotics operating systems and embedded control platforms, are pushing the envelope in robotics research. Human sciences are providing new insight and inspiration in natural motor control, impedance control, and postural and motion synergies. Our goal is to exploit these breakthroughs to the fullest to build accessible and safe robots.”

Languages

Italian

Native Language

English

Fluent.

Fluent

- Advanced reading and verbal comprehension.
- Good writing and speaking skills.

Personal Skills and Competences

Engineering

Excellent knowledge and excellent suitability for the use of standard tools workshop and machine shop, skills gained from activities in laboratory and self-taught.

Excellent Knowledge of the operation and use of major equipment tool cabinet, such as lathe, drilling machine (conventional and CNC). Skills acquired by mechanical technology courses, laboratory work and prototype development.

Excellent Knowledge of measuring instruments and use of laboratory typical sensing devices, such as encoders, I/O cards, force sensors and others.

Excellent Knowledge of design techniques and production of rapid prototyping.

High-End experience in design for manufacturing and production of multiple series.

High-End experience in coordination of activities related to Mechanical and Electrical HW development.

Mechanical Engineering Software

- Advanced knowledge in the use of the following softwares: PTC Creo, Ansys, Fluent, Mathcad, Matlab, MasterCAM, Leios, Geomagic, Workspace, Virtual Realm Builder, Mathematica.
- Good knowledge of CNC languages (Heidenhain iTNC 530)
- Basic knowledge in the use of the following softwares: Autocad, SolidWorks, Adams, Catia.

Programming Software

- Advanced knowledge: Matlab
- Basic knowledge in: LAbview, C# and Others

Multimedia Design

- Advanced knowledge in the use of the following softwares: Adobe Photoshop, Final Cut X s.
- Basic knowledge in the use of the following softwares: Adobe After Effects and Adobe Premiere.
- Some knowledge in 3d Studio Max, SketchUp and others.

Basic Software and Hardware

- Advanced knowledge in Windows and Mac OS X Operational Systems;
- Basic knowledge in Linux;
- Advanced knowledge in the following common use software: Office (Word, Excel, PowerPoint, Access, Visio), iWork, Internet Browsers (Internet Explorer, Outlook, Mozilla Firefox, Thunderbird, Safari, Mail), and many others.
- Advanced knowledge in software installation and computer maintenance.

Publications

- [64] C. Piazza, G. Grioli, M. G. Catalano and A. Bicchi, “**One Century of Robotics Hands: a Review**”, Annual Review of Control, Robotics, and Autonomous Systems 2018. Accepted.
-

- [63] Ciullo A., Felici F., Catalano M., Grioli G., Ajoudani A., Bicchi A., **“Toward an Active Supernumerary Hand for Grasping Assistance: Analytical and Experimental Analysis for Performance Optimization”**, IEEE/RA-L Robotics and Automation Letters, 2018
- [62] Ciullo A., Felici F., Catalano M., Grioli G., Ajoudani A., Bicchi A., **“Toward an Active Supernumerary Hand for Grasping Assistance: Analytical and Experimental Analysis for Performance Optimization”**, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- [61] Negrello F., Settini A., Caporale D., Lentini G., Poggiani M., Kanoulas D., Muratore L., Luberto E., Santaera G., Ciarleglio L., Ermini L., Pallottino L., Caldwell D. G., Tsagarakis N., Bicchi A., Garabini M., and Catalano M. G., **“Humanoids at Work: The WALK-MAN Robot in a Post-earthquake Scenario”**, IEEE Robotics & Automation Magazine, In Press
- [60] Della Santina C., Piazza C., Grioli G., Catalano M.G. and Bicchi A., **“Towards Dexterous Manipulation with Augmented Adaptive Synergies: the Pisa/IIT SoftHand 2”**, IEEE Transaction on Robotics, In press
- [59] Rossi M., Bianchi M., Battaglia E., Catalano M. G., and Bicchi A., **“HapPro: a wearable haptic device for proprioceptive feedback”**, IEEE Transactions on Biomedical Engineering, In Press
- [58] Della Santina C., Bianchi M., Averta G., Ciotti S., Arapi V., Fani S., Battaglia E., Catalano M.G., Santello M., Bicchi A., **“Postural hand synergies during environmental constraint exploitation”**, Frontiers in Neurorobotics, vol. 11
- [57] Godfrey S.B., Rossi M., Piazza C., Catalano M.G., Bianchi M., Grioli G., Zhao K.D., Bicchi A., **SoftHand at the CYBATHLON: A user's experience**, Journal of NeuroEngineering and Rehabilitation, vol. 14, (no. 1)
- [P56] C. Piazza, M. G. Catalano; S. B. Godfrey, M. Rossi, G. Grioli, M. Bianchi, K. Zhao and A. Bicchi, **“The SoftHand Pro-H: a Hybrid Body-Controlled, Electrically-Powered Hand Prosthesis for Daily Living and Working.”**, IEEE Robotics and Automation Magazine (RAM), vol. 24, (no. 4), pp. 87-101.
- [P55] S. Mghames, M. Laghi, C. Della Santina, M. Garabini, M. Catalano, G. Grioli and A. Bicchi, **“Design, control and validation of the variable stiffness exoskeleton FLExo”**, 2017 International Conference on Rehabilitation Robotics (ICORR), London, United Kingdom, 2017, pp. 539-546.

- [P54] M. Rossi, C. Della Santina, C. Piazza, G. Grioli, M. Catalano and A. Bicchi, "**Preliminary results toward a naturally controlled multi-synergistic prosthetic hand**", 2017 International Conference on Rehabilitation Robotics (ICORR), London, United Kingdom, 2017, pp. 1356-1363.
- [P53] C. Della Santina, C. Piazza, G. Santaera, Giorgio Grioli, M. G. Catalano and Antonio Bicchi, "**Estimating Contact Forces from Postural Measures in a class of Under-Actuated Robotic Hands**", in IEEE International Conference of Intelligent Robots and Systems (IROS2017), Vancouver, Canada, September 24-28, 2017, In Press.
- [P52] Francesca Negrello, Manuel Giuseppe Catalano, Manolo Garabini, Mattia Poggiani, Darwin G. Caldwell, Nikos Tsagarakis, Antonio Bicchi, "**Design and Characterisation of a Novel High-Compliance Spring for Robots with Soft Joints**", IEEE International Conference on Advanced Intelligent Mechatronics (AIM2017), Munich, Germany, July 3-7, 2017.
- [P51] M. Laghi, A. Ajoudani, Catalano, M. G., and Bicchi, A., "**A Bilateral Tele-Impedance Controller for Remote Interaction with Transmission Time Delay**", in IEEE International Conference of Intelligent Robots and Systems (IROS2017), Vancouver, Canada, September 24-28, 2017, In Press.
- [P50] S. Casini, Tincani, V., Averta, G., Poggiani, M., C. Della Santina,, Battaglia, E., Catalano, M. G., Bianchi, M., Grioli, G., and Bicchi, A., "**Design of an Under-Actuated Wrist Based on Adaptive Synergies**", in IEEE International Conference of Robotics and Automation, ICRA2017, In Press.
- [P49] S. Fani, Ciotti, S., Catalano, M. G., Grioli, G., A. Ajoudani, and Bianchi, M., "**Simplifying telerobotics: Wearability and teleimpedance improves human-robot interactions in teleoperation**", IEEE Robotics and Automation Magazine (RAM), vol. 25, (no. 1), pp. 77-88.
- [P48] E. Battaglia, Clark, J. P., Bianchi, M., Catalano, M. G., Bicchi, A., and O'Malley, M. K., "**The Rice Haptic Rocker: skin stretch haptic feedback with the Pisa/IIT SoftHand**", in IEEE World Haptics Conference, Fürstfeldbruck (Munich), Germany, June 6-9, 2017, 2017.
- [P47] C. Della Santina, Piazza, C., Gasparri, G. M., Bonilla, M., Catalano, M. G., Grioli, G., Garabini, M., and Bicchi, A., "**The Quest for Natural Machine Motion: An Open Platform to Fast-Prototyping Articulated Soft Robots**", IEEE Robotics and Automation Magazine , vol. 24, no. 1, pp. 48 - 56, 2017 [Online].

- [P46] C. Della Santina, Bianchi, M., Grioli, G., Angelini, F., Catalano, M. G., Garabini, M., and Bicchi, A., **“Controlling Soft Robots: Balancing Feedback and Feedforward Elements”**, IEEE Robotics and Automation Magazine, 2017 [Online].
- [P45] Brygo A., Sarakoglou I., Ajoudani A., Hernandez N.G., Grioli G., Catalano M. G., Caldwell D. G., Tsagarakis N. G., **“Synergy-based interface for bilateral tele-manipulations”**, 2016 IEEE International Conference on Robotics and Automation, pp. 4859-4865, Stockholm, Sweden
- [P44] S. B. Godfrey, Bianchi, M., Zhao, K., Catalano, M. G., Breighner, R., Theuer, A., Andrews, K., Grioli, G., Santello, M., and Bicchi, A., **“The SoftHand Pro: Translation from Robotic Hand to Prosthetic Prototype”**, in Converging Clinical and Engineering Research on Neurorehabilitation II, vol. 15, Springer International Publishing, 2016, pp. 469-473 [Online].
- [P43] C. Piazza, C. Della Santina,, Catalano, M. G., Grioli, G., Garabini, M., and Bicchi, A., **“Natural encoding of user intentions in a soft prosthesis using Dynamic Synergies”**, in International Workshop on Human-Friendly Robotics, 2016.
- [P42] S. Wolf, Grioli, G., Eiberger, O., Friedl, W., Grebenstein, M., Hoppner, H., Burdet, E., Caldwell, D. G., Carloni, R., Catalano, M. G., Lefeber, D., Stramigioli, S., Tsagarakis, N. G., Damme, V. M., Ham, V. R., Vanderborght, B., Visser, L. C., Bicchi, A., and Albu-Schaeffer, A., **“Variable Stiffness Actuators: Review on Design and Components”**, IEEE/ASME Transactions on Mechatronics , vol. 21, no. 5, pp. 2418 - 2430, 2016 [Online].
- [P41] M. Garabini, C. Della Santina,, Bianchi, M., Catalano, M. G., Grioli, G., and Bicchi, A., **“Soft Robots that Mimic the Neuromusculoskeletal System”**, in 3rd International Conference on NeuroRehabilitation (ICNR2016), 2016, vol. Converging Clinical and Engineering Research on Neurorehabilitation, pp. 259-263 [Online].
- [P40] Gian Maria Gasparri, Filippo Fabiani, Manolo Garabini, Lucia Pallottino, Manuel Giuseppe Catalano Giorgio Grioli, Riccardo Persichini (202324), Antonio Bicchi, **“Robust Optimization of System Compliance for Physical Interaction in Uncertain Scenarios “**, in 16th IEEE RAS Humanoids Conference (HUMANOIDS2016), 2016.
- [P39] Cristina Piazza, Cosimo Della Santina, Gian Maria Gasparri, Manuel G. Catalano, Giorgio Grioli, Manolo Garabini, Antonio Bicchi, **“Toward an**

Adaptive Foot for Natural Walking, in 16th IEEE RAS Humanoids Conference (HUMANOIDS2016), 2016.

- [P38] N. G. Tsagarakis, Caldwell, D. G., Negrello, F., Choi, W., Baccelliere, L., Loc, V. G., Noorden, J., Muratore, L., Margan, A., Cardellino, A., Natale, L., E. Hoffman, M., Dallali, H., Kashiri, N., Malzahn, J., Lee, J., Kryczka, P., Kanoulas, D., Garabini, M., Catalano, M. G., Ferrati, M., Varricchio, V., Pallottino, L., Pavan, C., Bicchi, A., Settini, A., Rocchi, A., and A. Ajoudani, ***“WALK-MAN: A High-Performance Humanoid Platform for Realistic Environments”***, Journal of Field Robotics, vol. 34, no. 4, pp. 1 - 34, 2017 [Online].
- [P37] C. Piazza, C. Della Santina, Catalano, M. G., Grioli, G., Garabini, M., and Bicchi, A., ***“SoftHand Pro-D: Matching Dynamic Content of Natural User Commands with Hand Embodiment for Enhanced Prosthesis Control”***, in IEEE International Conference of Robotics and Automation (ICRA2016), Stockholm, Sweden, May 16-21, 2016.
- [P36] E. Battaglia, Bianchi, M., Altobelli, A., Grioli, G., Catalano, M. G., Serio, A., Santello, M., and Bicchi, A., ***“ThimbleSense: a fingertip-wearable tactile sensor for grasp analysis”***, IEEE Transactions on Haptics, vol. 9, no. 1, pp. 121-133, 2016
- [P35] F. Negrello, Garabini, M., Catalano, M. G., Kryczka, P., Choi, W., Caldwell, D. G., Bicchi, A., and Tsagarakis, N. G., ***“WALK-MAN humanoid lower body design optimization for enhanced physical performance”***, in IEEE International Conference of Robotics and Automation (ICRA2016), Stockholm, Sweden, May 16-21, 2016, 2016, pp. 1817 - 1824
- [P34] S. Casini, Morvidoni, M., Bianchi, M., Catalano, M. G., Grioli, G., and Bicchi, A., ***“Design and Realization of the CUFF - Clenching Upper-Limb Force Feedback Wearable Device for Distributed Mechano-Tactile Stimulation of Normal and Tangential Skin Forces”***, in IEEE International Conference of Intelligent Robots and Systems - IROS2015, Hamburg, Germany, 28 Sept - 2 Oct 2015, 2015, pp. 1186 - 1193
- [P33] C. Della Santina, Grioli, G., Catalano, M. G., Brando, A., and Bicchi, A., ***“Dexterity augmentation on a synergistic hand: the Pisa/IIT SoftHand+”***, in 15th IEEE RAS Humanoids Conference (HUMANOIDS2015), Seoul, Korea, November 3 - 5, 2015, 2015, pp. 497 - 503
- [P32] A. Altobelli, Bianchi, M., Catalano, M. G., Serio, A., Baud-Bovy, G., and Bicchi, A., ***“An Instrumented Manipulandum For Human Grasping Studies”***, in IEEE International Conference on Robotics and Automation (ICRA2015), Submitted.

- [P31] G. Mathijssen, Terry, S., Funemont, R., Garabini, M., Catalano, M. G., Grioli, G., Lefeber, D., Bicchi, A., and Vanderborght, B., **“Potential merits for space robotics from novel concepts of actuation for soft robotics”**, in Advanced Space Technologies for Robotics and Automation (ASTRA) , Noordwijk, The Netherlands May 11-13, 2015, 2015.
- [P30] F. Negrello, Garabini, M., Catalano, M. G., Malzahn, J., Caldwell, D. G., Bicchi, A., and Tsagarakis, N. G., **“A Modular Compliant Actuator for Emerging High Performance and Fall-Resilient Humanoids”**, in 15th IEEE RAS Humanoids Conference (HUMANOIDS2015), 2015.
- [P29] A. Velasco, Garabini, M., Catalano, M. G., and Bicchi, A., **“Soft Actuation in Cyclic Motions: Stiffness Profile Optimization for Energy Efficiency”**, in 15th IEEE RAS Humanoids Conference (HUMANOIDS2015), 2015, pp. 107 - 113
- [P28] G. M. Gasparri, Garabini, M., Pallottino, L., Malagia, L., Catalano, M. G., Grioli, G., and Bicchi, A., **“Optimality Principles in Stiffness Control for Oscillation Damping: Slow-Down and Stiff, Speed-Up and soft”**, in IEEE International Conference on Robotics and Automation (ICRA2015), Seattle, USA, 25 - 30 May, Submitted
- [P27] M. Bonilla, Farnioli, E., Piazza, C., Catalano, M. G., Grioli, G., Garabini, M., Gabiccini, M., and Bicchi, A., **“Grasping with Soft Hands ”**, in International Conference on Humanoid Robots IEEE-RAS 2014, Madrid, Spain, November 18 - 20, In Press.
- [P26] G. Grioli, Wolf, S., Garabini, M., Catalano, M. G., Burdet, E., Caldwell, D. G., Carloni, R., Friedl, W., Grebenstein, M., Laffranchi, M., Lefeber, D., Stramigioli, S., Tsagarakis, N. G., Damme, V. M., Vanderborght, B., Albu-Schaeffer, A., and Bicchi, A., **“Variable Stiffness Actuators: the user’s point of view”**, Int. J. Robotics Research, In Press.
- [P25] M. G. Catalano, Grioli, G., Farnioli, E., Serio, A., Piazza, C., and Bicchi, A., **“Adaptive Synergies for the Design and Control of the Pisa/IIT SoftHand”**, International Journal of Robotics Research, vol. 33, no. 5, pp. 768–782, 2014.
- [P24] S. B. Godfrey, Ajoudani, A., Bianchi, M., Catalano, M. G., Grioli, G., and Bicchi, A., **“Exploring haptic feedback for the Pisa/IIT SoftHand”**, in Haptics Symposium (HAPTICS), 2014 IEEE, Houston, TX, 2014.
- [P23] A. Ajoudani, Godfrey, S. B., Catalano, M. G., Bianchi, M., Grioli, G., Tsagarakis, N. G., and Bicchi, A., **“Exploring Teleimpedance and Tactile Feedback for Intuitive Control of the Pisa/IIT SoftHand”**, IEEE Transactions on Haptics, vol. 7, no. 2, pp. 203 - 215, 2014 [Online].

- [P22] K. Melo, Garabini, M., Grioli, G., Catalano, M. G., Malagia, L., and Bicchi, A., **“Open Source VSA-CubeBots for Rapid Soft Robot Prototyping ”**, in Robot Makers - Workshop in conjunction with 2014 Robotics Science and Systems, July 12, 2014, Berkeley, California , 2014.
- [P21] E. Battaglia, Grioli, G., Catalano, M. G., Bianchi, M., Serio, A., Santello, M., and Bicchi, A., **“ThimbleSense: A new wearable tactile device for human and robotic fingers ”**, in Haptics Symposium (HAPTICS), 2014 IEEE, Houston,
- [P20] E. Battaglia, Grioli, G., Catalano, M. G., Santello, M., and Bicchi, A., **“ThimbleSense: An Individual-Digit Wearable Tactile Sensor for Experimental Grasp Studies”**, in IEEE International Conference on Robotics and Automation - ICRA 2014, Hong Kong, May 31 - June 7, 2014, 2014, pp. 2728 - 2735
- [P19] V. Tincani, Grioli, G., Catalano, M. G., Bonilla, M., Garabini, M., Fantoni, G., and Bicchi, A., **“Controlling the active surfaces of the Velvet Fingers: sticky to slippery fingers”**, in IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2013, Tokyo, Japan, 2013, pp. 5494 - 5499
- [P18] V. Tincani, Grioli, G., Catalano, M. G., Garabini, M., Grechi, S., Fantoni, G., and Bicchi, A., **“Implementation and Control of the Velvet Fingers: a Dexterous Gripper with Active Surfaces”**, in IEEE International Conference on Robotics and Automation (ICRA2013), 2013, pp. 2744 - 2750
- [P17] R. Incaini, Sestini, L., Garabini, M., Catalano, M. G., Grioli, G., and Bicchi, A., **“Optimal Control and Design Guidelines for Soft Jumping Robots: Series Elastic Actuation and Parallel Elastic Actuation in comparison”**, in IEEE International Conference on Robotics and Automation (ICRA2013), 2013, pp. 2477 - 2484
- [P16] S. B. Godfrey, Ajoudani, A., Catalano, M. G., Grioli, G., and Bicchi, A., **“A synergy-driven approach to a myoelectric hand”**, in 13TH International Conference on Rehabilitation Robotics, June 24-26, 2013, Seattle, WA., 2013, pp. 1 - 6
- [P15] A. Ajoudani, Godfrey, S. B., Catalano, M. G., Grioli, G., Tsagarakis, N. G., and Bicchi, A., **“Teleimpedance Control of a Synergy-Driven Anthropomorphic Hand”**, in IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2013, Tokyo, Japan, 2013, pp. 1985 - 1991
- [P14] B. Vanderborght, Albu-Schaeffer, A., Bicchi, A., Burdet, E., Caldwell, D. G., Carloni, R., Catalano, M. G., Eiberger, O., Friedl, W., Ganesh, G., Garabini, M., Grebenstein, M., Grioli, G., Haddadin, S., Hoppner, H., Jafari, A.,

- Laffranchi, M., Lefeber, D., Petit, F., Stramigioli, S., Tsagarakis, N. G., Damme, V. M., Ham, V. R., Visser, L. C., and Wolf, S., **“Variable Impedance Actuators: a Review”**, Robotics and Autonomous Systems, vol. 61, no. 12, pp. 1601–1614, 2013 [Online].
- [P13] G. Grioli, Catalano, M. G., Silvestro, E., Tono, S., and Bicchi, A., **“Adaptive Synergies: an approach to the design of under-actuated robotic hands”**, in International Conference of Intelligent Robots and Systems - IROS 2012, Vilamoura, Algarve, Portugal, 2012, pp. 1251 - 1256 .
 - [P12] M. Mancini, Grioli, G., Catalano, M. G., Garabini, M., Bonomo, F., and Bicchi, A., **“Passive impedance control of a Qboid multi-DOF VSA-CubeBot manipulator”**, in International Conference of Robotics and Automation - ICRA 2012, Saint Paul, MN, USA, 2012, pp. 3335 - 3340
 - [P11] L. Balletti, A. Rocchi, F. Belo, M.G. Catalano, M. Garabini, G. Grioli, and A. Bicchi. **“Towards variable impedance assembly: the VSA peg-in-hole.”** In IEEE-RAS International Conference on Humanoid Robots, Osaka, Japan, 2012.
 - [P10] M. G. Catalano, Grioli, G., Serio, A., Farnioli, E., Piazza, C., and Bicchi, A., **“Adaptive Synergies for a Humanoid Robot Hand”**, in IEEE-RAS International Conference on Humanoid Robots, Osaka, Japan, 2012, pp. 7-14.
 - [P9] M. G. Catalano, G. Grioli, M. Garabini, F. A. W. Belo, A. di Basco, N. Tsagarakis, and A. Bicchi. **“Implementing a Variable Impedance Actuator.”** In International Conference of Robotics and Automation - ICRA 2012, Saint Paul, MN, USA, pages 2666 - 2672, May 14 - 18 2012.
 - [P8] V. Tincani, M. G. Catalano, E. Farnioli, M. Garabini, G. Grioli, G. Fantoni, and A. Bicchi. **“Velvet Fingers: A Smart Gripper with Controlled Contact Surfaces.”** In International Conference of Intelligent Robots and Systems - IROS 2012, Vilamoura, Algarve, Portugal, October 7 - 12 2012.
 - [P7] **A. Serio, M. G. Catalano, G. Grioli, M. Gabiccini, and A. Bicchi. “The Hand Embodied.”** In Automatica.it 2011, Pisa, Italy, September, 7 - 9 2011. Note: Poster presentation.
 - [P6] G. Grioli, M. G. Catalano, M. Garabini, F. Bonomo, A. Serio, P. Salaris, F. A. W. Belo, M. Mancini, A. Bicchi, and A. Passaglia. **“Variable stiffness actuators: muscles for the next generation of robots.”** In Automatica.it 2011, Pisa, Italy, September, 7 - 9 2011.
 - [P5] M. G. Catalano, G. Grioli, M. Garabini, F. Bonomo, and A. Bicchi. **“VSA - CubeBot. A modular variable stiffness platform for multi degrees of freedom systems.”** In 2011 IEEE International Conference on Robotics and Automation, 2011.

- [P4] M. G. Catalano, G. Grioli, F. Bonomo, R. Schiavi, and A. Bicchi. **“VSA-HD: From the Enumeration Analysis to the Prototypical Implementation.”** In IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis MO USA, pages 3676 - 3681, October 2010. Keyword(s): Robotics, Embedded Control.
- [P3] Fagiolini, F. A. W. Belo, M. G. Catalano, S. Alicino, F. Bonomo, and A. Bicchi. Design and Control of a Novel 3D Casting Manipulator. In IEEE International Conference on Robotics and Automation (ICRA2010), Anchorage, Alaska, May 3 - 8 2010.
- [P2] M. G. Catalano, R. Schiavi, and A. Bicchi. **“Design of Variable Stiffness Actuators Mechanisms based on Enumeration and Analysis of Performance.”** In IEEE International Conference on Robotics and Automation (ICRA2010), Anchorage, Alaska, May 3 - 8 2010.
- [P1] S. Alicino, Catalano, M. G., Bonomo, F., Belo, F. A. W., Grioli, G., Schiavi, R., Fagiolini, A., and Bicchi, A., **“A Rough-Terrain, Casting Robot for the ESA Lunar Robotics Challenge”**, in Proc. IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis MO USA, 2009, pp. 3336-3342.

Book Chapters

- [B2] Manuel Bonilla, Cosimo Della Santina, Alessio Rocchi, Emanuele Luberto, Gaspare Santaera, Edoardo Farnioli, Cristina Piazza, Fabio Bonomo, Alberto Brando, Alessandro Raugi, Manuel Catalano, Matteo Bianchi, Manolo Garabini, Giorgio Grioli and Antonio Bicchi, **“Advanced Grasping with the Pisa/IIT SoftHand”**, in Human and Robot Hands, "Robotic Grasping and Manipulation Competition", Springer, 2017. In Press
- [B1] M. G. Catalano, Grioli, G., Farnioli, E., Serio, A., Bonilla, M., Garabini, M., Piazza, C., Gabiccini, M., and Bicchi, A., **“From Soft to Adaptive Synergies: The Pisa/IIT SoftHand”**, in Human and Robot Hands, vol. Springer Series on Touch and Haptic Systems, Springer, 2016.

Video

- [V1] B. Vanderborght, A. Albu-Schaeffer, A. Bicchi, E. Burdet, D. G. Caldwell, R. Carloni, M. G. Catalano, G. Ganesh, M. Garabini, G. Grioli, S. Haddadin, A. Jafari, M. Laffranchi, D. Lefeber, F. Petit, S. Stramigioli, N. Tsagarakis, M. Van

Damme, R. Van Ham, L. C. Visser, and Sebastian Wolf. ***“Variable Impedance Actuators: Moving the Robots of Tomorrow”***, October 7 - 12 2012. (Video)