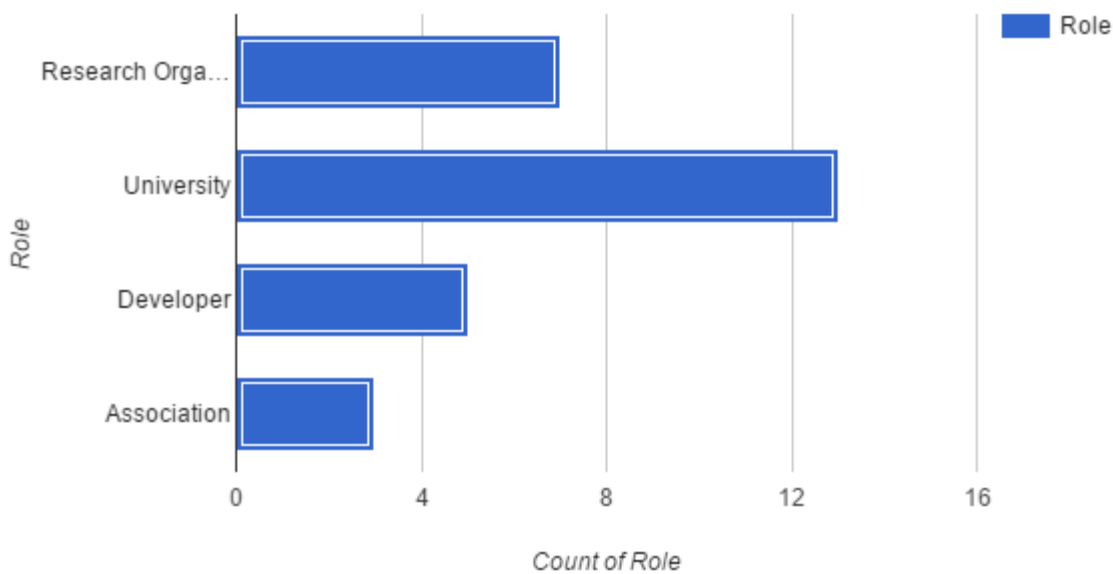


F **euRobotics: Italy**

13 Universities
7 Research Organizations
5 Developers
3 Associations
Total: 28



Research Organizations

I. IIT: Fondazione Istituto Italiano di Tecnologia

<https://www.iit.it/>

Genova, Italy

It is a research foundation created and financed by the government to conduct scientific research in the areas of technological development for the public interest.

The research approach is one of the greater opportunities and challenges for robotics in order to study and enhance the concept of robotics inspired by nature and human-machine interaction.

The Robotics program is divided in four platforms:

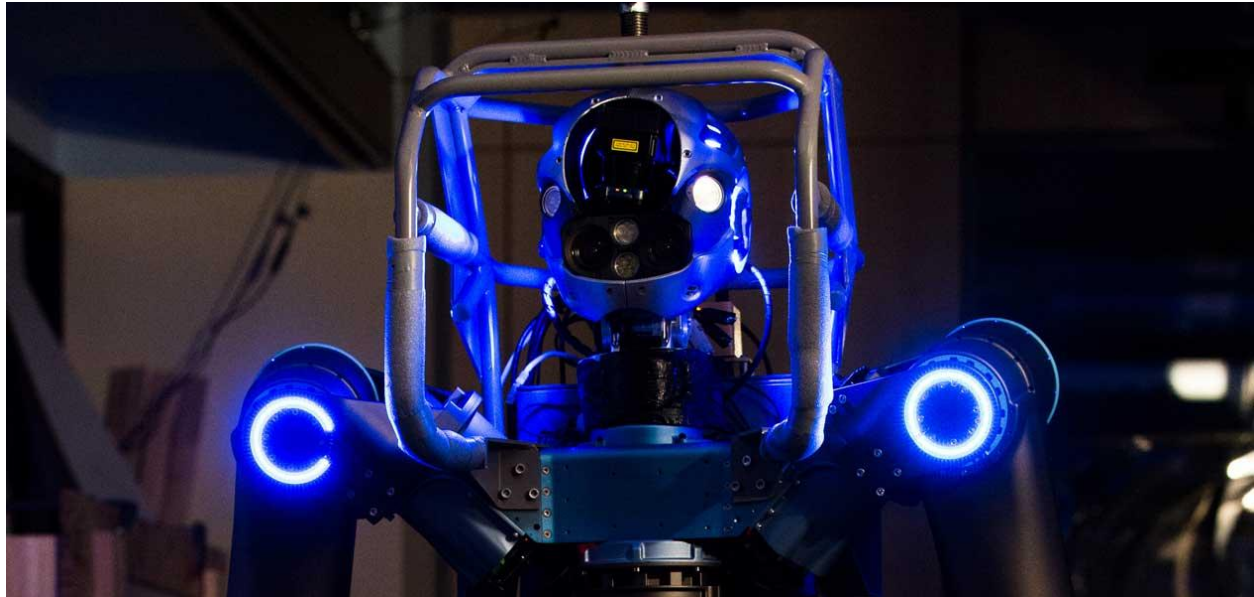
1. iCub – The Cub robot created to study the cognitive aspects
2. HyQ – The Four-footed robot built to help rescue teams in risky operations
3. Walkman and Coman – The robots developed to replace rescuers in hazardous areas and natural disasters

4. Plantoid – The first robot worldwide inspired by plants and to be made use of in underground applications and in environmental reclaim

Humanoid Sensing and Perception

Principal Investigator - Lorenzo Natale

The Humanoid Sensing and Perception research aims at developing humanoid robots that are progressively more autonomous and can effectively work in unstructured environments, operating in close interaction and cooperation with humans. At this aim the group studies algorithms and technologies that allow robots to sense the environment and react appropriately.



Walk-Man: <http://www.walk-man.eu/>

Overall Goal

Development of a high performance humanoid robot: Integrate suitable technologies to develop a humanoid robot capable of walking inside human oriented infrastructures, manipulating human tools and interfaces.

II. Siena Robotics and Systems Lab

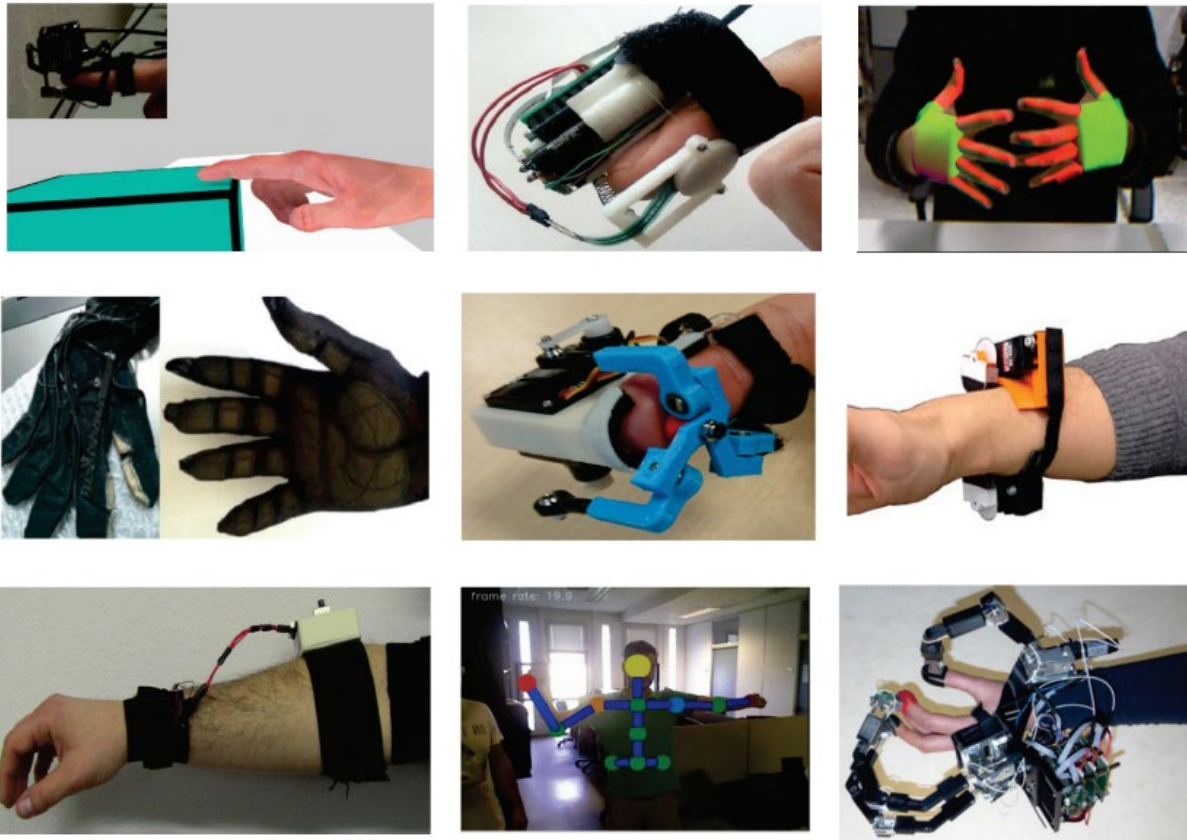
<http://sirslab.diism.unisi.it/research.html>

Siena, Italy

- *Hand Centered Robotics is a group of the SIRSLab, which is part of the Dipartimento di Ingegneria Informatica of the University of Siena .*
- *Main Research Activities are in Haptics, Grasping, Robotic Vision, Mobile Robotics and Medical Robotics.*

WEARHAP: WEARable HAPTics for Humans and Robots

Link: <http://www.wearhap.eu/>



- A wearable and its architectural concept is envisioned in the figure where devices interacting with the finger pads, the elbow and the skin are sketched.
- Robotics that will enable novel forms of communication and cooperation between humans and robots.

DALi: Devices for Assisted Living <http://www.ict-dali.eu/dali/index.html>



- The interaction with users from different EU countries is contributing to the creation of a unified european view on how to deal with problems of ageing well (“global” partners like Siemens, assessing second prototypes in Spain at an elders’ home)
- Substantial efficiency gains for care provision and augmented independence and quality of life for the ageing population.
- Case study reports about robotics and assisted living

Universities

I. Università di Pisa - Centro E. Piaggio **Bioengineering and Robotics Research Center**

- Embedded and Networked Control
- Hands and Haptics: <http://www.centropiaggio.unipi.it/research/hands-and-haptics.html>

Development of Robotic Hands

PISA-IIT SoftHand: One of the motivations behind the development of humanoid robots is the will to comply with, and fruitfully integrate in the human environment, a world forged by humans for humans, where the importance of the hand shape dominates prominently.

PISA-IIT SoftHand implements the concept of adaptive synergies for actuation with an high degree of integration, in a humanoid shape.



The Pisa/IIT SoftHand is simple, robust and effective in grasping.

- Mobile Robotics
- Underwater Robotics

- Physical Human-Robot Interaction

Physical Human-Robot Interaction

PHRI robots will be designed to coexist and cooperate with humans in applications such as assisted industrial manipulation, collaborative assembly, domestic work, entertainment, rehabilitation or medical applications.

It might be possible to relax requirements on velocity of execution and absolute accuracy, concerns such as safety and dependability become of paramount importance when human lives are involved.

The inherent danger to humans of conventional arms can indeed be mitigated by drastically increasing their sensorization and changing their controllers.

One alternative approach at increasing the safety level of robot arms interacting with humans is to introduce compliance right away at the mechanical design level. Accuracy in positioning and stiffness tuning would then be recovered by suitable control policies. This approach is clearly closer in inspiration to biological muscular apparatuses than to classical machine-tool design, which has inspired most robotics design thus far.

To make this possible, a new class of actuators was developed, the so-called Variable Impedance Actuators (VIA). The source of inspiration is the muscular system of humans and animals- just as human and animal muscles move in opposite directions to move limbs, VIA muscles achieve simultaneous control of the robot arm by using two motors arranged so as to control both the equilibrium point of the arm, and its rigidity or compliance. The Research Center “E. Piaggio” of the University of Pisa has developed a whole new range of VIA muscles using both bio-inspired and more sophisticated antagonistic concepts to implement VIA muscles.



Centro Piaggio is partner of the Natural Machine Motion Initiative, supported by the network of universities and research centers working in SAPHARI project for the creation of a new generation of robots that can coexist with humans in everyday life. www.naturalmachinemotioninitiative.com




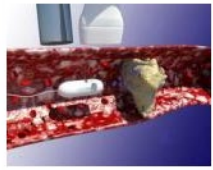




List of projects: <http://www.centropiaggio.unipi.it/projects>

Example: <http://www.phriends.eu/objectives.htm>

II. The BioRobotics Institute

<http://sssa.bioroboticsinstitute.it/> Pontedera (PI), Italy

The BioRobotics Institute (part of a university) is an integrated system aimed at innovative research, education and technology transfer, and it intends to create new companies in high tech sectors.

<p>Artificial Hands</p>  <p>Research into mechatronics and human-machine interfaces for advanced robotic limbs to be used as thought-controlled prostheses</p>	<p>Neuro Robotics</p>  <p>The fusion of neuroscience and robotics to develop wearable robots allowing the human-robot symbiosis.</p>	<p>Soft Robotics</p>  <p>The use of compliant materials and variable-stiffness technologies, to develop a new generation of soft robots.</p>	<p>Surgical Robotics and Allied Technologies</p>  <p>Investigate problems, identify enabling technologies and develop solutions for addressing the field of minimally invasive and targeted therapy and diagnosis.</p>
<p>Robot Companions for Citizens</p>  <p>Neurodevelopmental bioengineering, Ambient Assisted Living, Service robotics, Marine robotics, Ethical, legal</p>	<p>Sensor signals and Information processing</p>  <p>Design, development and validation of wearable inertial sensor systems for ambulatory human motion monitoring.</p>	<p>Translational Neural Engineering (TNE)</p>  <p>Combining engineering, including micro and nanotechnology, electrical and mechanical, and computer</p>	<p>Creative Engineering Design</p>  <p>Merging creativity with robust engineering methodologies to develop new machines and usable systems in robotics and</p>

Roboethics

Ethical, legal and social implications emerging from the interactions between robots and human beings.

Project: RoboLaw <http://sssa.bioroboticsinstitute.it/projects/RoboLaw>

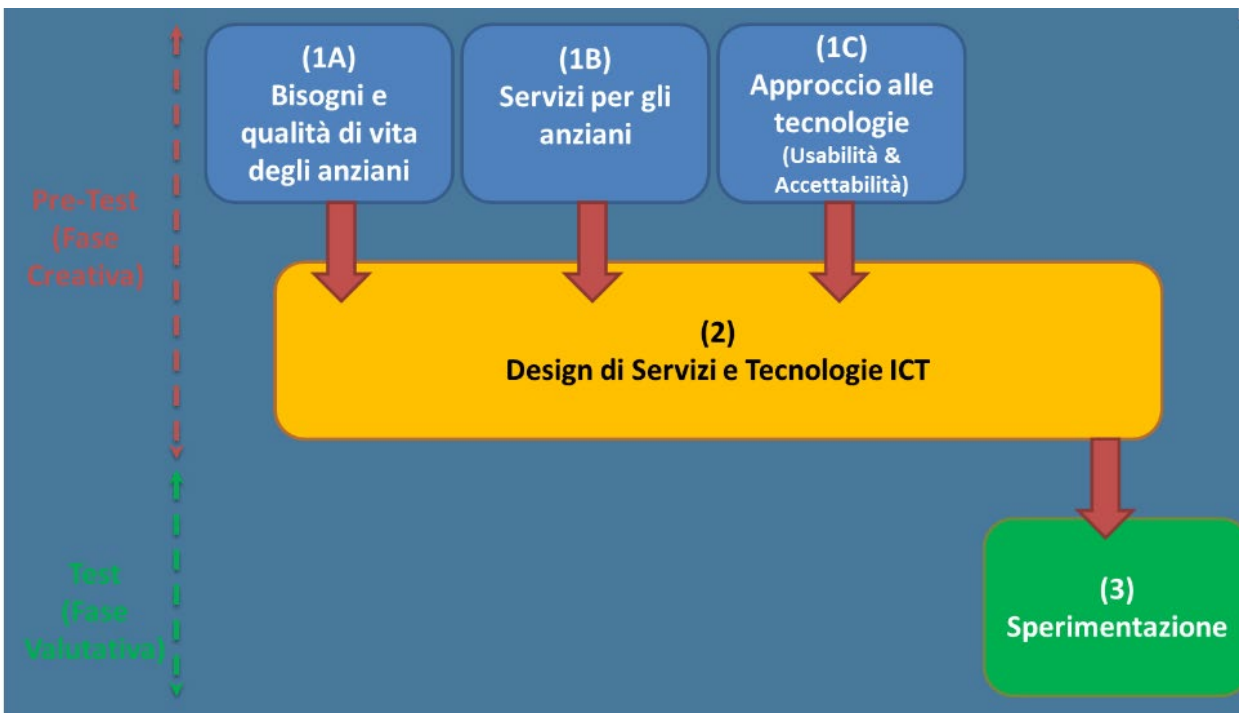
Assistive Robotics

The aim of the Assistive Robotics lab is to study and develop ICT technologies and robotics solutions able to provide assistance to elderly people in daily life. The main expected effects of these technologies are to improve the quality of life and the independence of senior persons and to support clinicians and caregivers in supplying services. The researches of this group are related to Ambient Assisted Living (AAL) and Service Robotics.

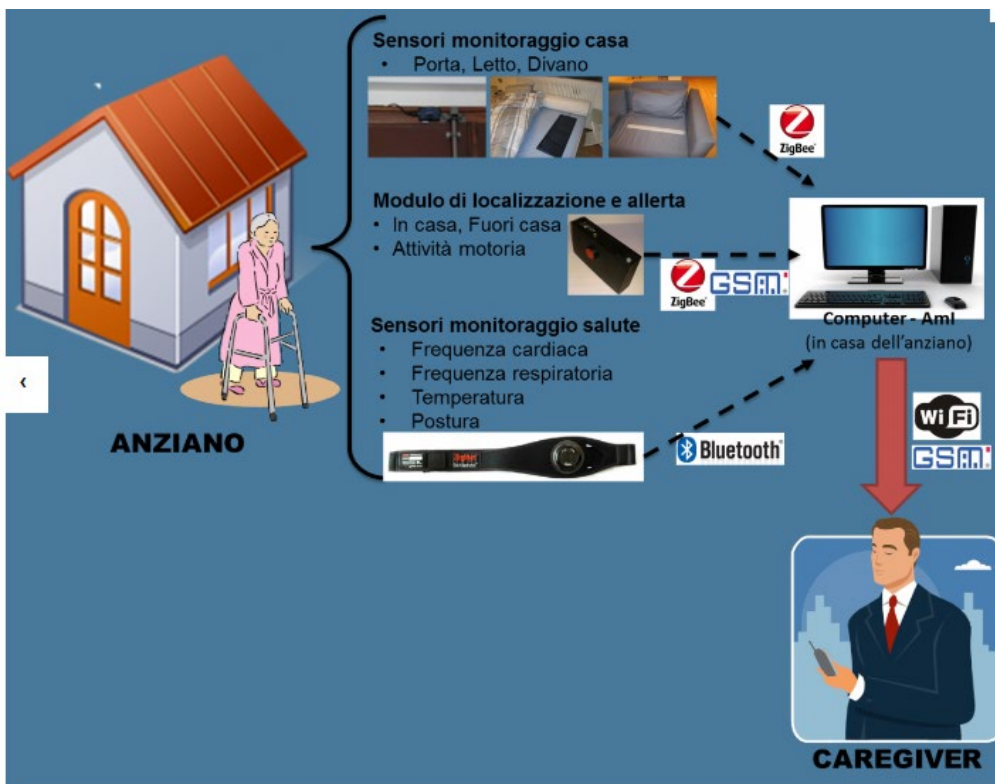
The main work areas of this group are:

- Wireless Sensor Networks & Smart Environments
- Assistive Robots for Indoor Spaces
- Biomechanics Evaluation of Parkinson's Disease on Feet and Hand Movements
- Roadmap and Strategic Research Agenda of AAL Research Priorities
- Usability and Acceptability of Advanced Technologies.

Past Grant: <http://sssa.bioroboticsinstitute.it/projects/RITA>

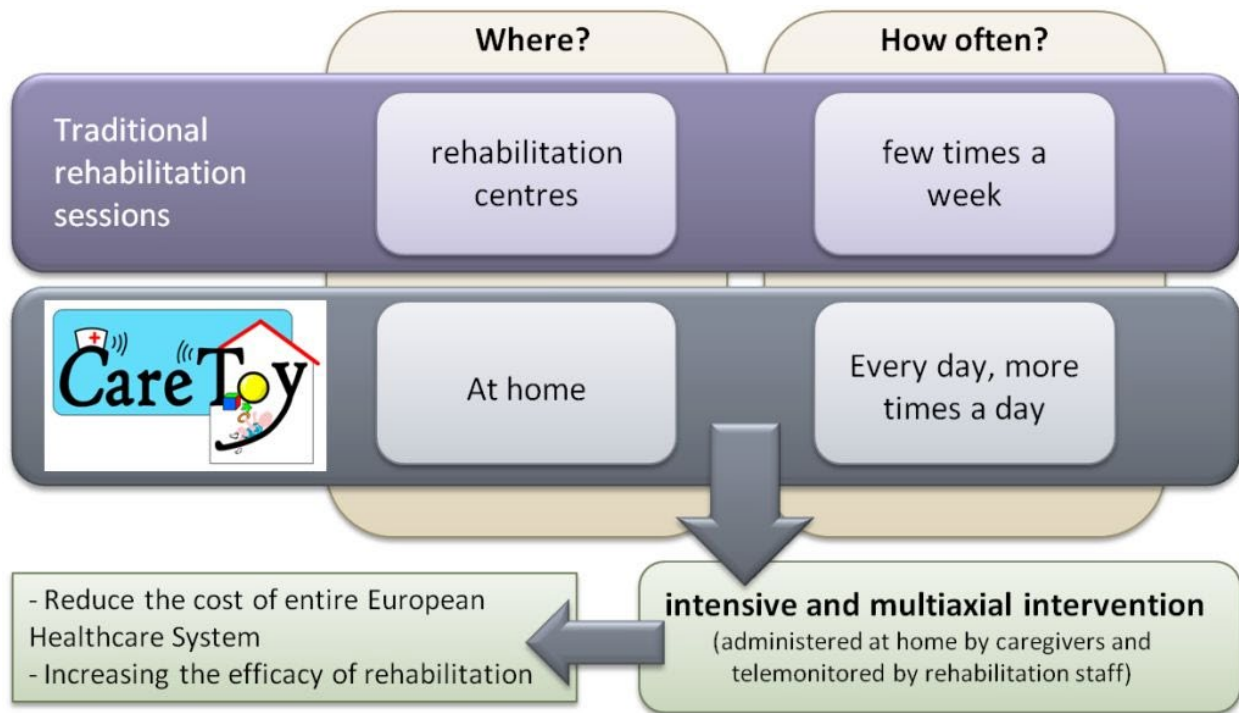


(is it robotics?)
Good chart for development/readiness levels?



Developed Project: CareToy
2012, still no product
developed for purchase, last
news 2014

<http://www.caretoy.eu/>




The smart system is based on a common baby gym, composed of different modules:


- an instrumented baby gym with mechatronic hanging toys, so that the infant's' actions on the gym can be measured and simulated,
- a vision module, for measuring and promoting infants' attention and gaze movements and
- a sensorized mat for measuring and promoting postural control.



Universities:


Name	Areas of research	Links to projects and photos
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Scuola Superiore Sant'Anna	<p>The Human Robot Interaction (HRI) 'devices that properly reflect human centered design requirements'.</p> <p>This group develop robotic devices that cooperate with human in a safe and intuitive way during the interaction in virtual environments</p> <p>These devices are being employed to replicate contact feelings during virtual presence, telepresence and haptic enhanced devices (such as for new generation of mobile vehicles).</p>	http://www.santannapisa.it/en/institute/tecip/human-robot-interaction
University of Rome "La Sapienza" - Dipartimento di Ingegneria informatica automatica e gestionale	<p>Robot Modeling, Planning, and Control</p> <p>Visual-based Control</p> <p>Sensor-based Planning and Exploration</p> <p>Navigation of Mobile Robots</p> <p>Networked Robots</p> <p>Physical Human-Robot Interaction</p>	http://www.dis.uniroma1.it/en/archivionotizie/robotics
Università di Genova, Dept. Informatics, Bioengineering, Robotics and System Engineering (DIBRIS)	<p>Artificial and bio-inspired sensing</p> <p>Knowledge representation and reasoning</p> <p>Action planning and robot motion control</p>	<p>Robotics</p> <p>http://www.dibris.unige.it/en/research/programs?view=pr_detail&prog=10</p>
Dipartimento Ingegneria Innovazione, Università del Salento	<p>Manufacturing, Mechanics</p>	<p>Other research areas:</p> <p>http://www.dii.unisalento.it/settori_di_ricerca</p>
University of Florence, Dept. Of Industrial Engineering	<p>Marine Robots</p> <p>Mobile Robots</p> <p>Image Based Visual Serving</p>	 <p>Mobile Robot Prototype</p> <p>Italian only:</p>

		http://www.mdm.unifi.it/CMpro-v-p-7.html
Politecnico di Milano	Aviation, Space Exploration, Bioengineering, Mechanical Engineering	<i>No project descriptions or lists</i>
Dipartimento di Ingegneria Elettrica e dell'Informazione, Università degli Studi di Cassino e del Lazio Meridionale		<i>No project descriptions</i>
	Biomedical robotics Biomicrosystems Artificial limbs	<p>Concluded project: MAAT - Multimodal interfaces to improve therapeutic outcomes in robot-Assisted rehabilitation</p> <p>Therapy for stroke patients with special attention on the issue of safety in human-robot interaction.</p> 
Università Campus Bio-medico di Roma	<p>Project Links: http://www.unicampus.it/eng/research/research-unit/biomedical-robotics-and-biomicrosystems</p>	Link: http://www.echord.info/wikis/website/maat
University of Padova	Nanosystem, Autonomous Robotic Systems	
ALMA MATER STUDIORUM Università di Bologna	Industrial Robots	

Developers

Finmeccanica S.p.a	Military/Defense	
Heron Robots S.R.L.	<p>Products: SoftGrasp: Tools for robust mobile manipulation, the kind way.</p> <p>PrehensileEye: moving eyes for ambient monitoring, indoor and out door.</p> <p>Awe: self organizing sensor and camera deployment for adaptive ambient monitoring.</p> <p>RoboCloud: tools for harnessing cloud power for distributed robot networks.</p>	<p>Awe Video: http://www.heronrobots.com/products/awe</p>
COMAU S.p.A.	Industrial robots, Modular robots	Auxiliary Robot:

	Controllers, Auxiliary Equipment, Software	 <p>Link: http://www.comau.com/en/our-competences/robotics/overview </p>
CNR-ISSIA-GE	Aerial, ground, and marine robots	Development of “unmanned” vehicles for exploration.
COESIA SpA	Industrial, automated machinery	

Research Organizations

ITIA-CNR Consiglio Nazionale delle Ricerche		<p>Link to projects: https://www.cnr.it/en/research-projects</p> <p>Ethics 2008 article: http://www.cnr.it/istituti/ProdottoDellaRicerca.html?cds=029&id=134904 </p>
University of Verona, Dept. of Computer Science - Altair Robotics Laboratory	<p>Robotic Surgery</p> <p>Rehabilitation Robotics</p> <p>Robotic Therapy and Diagnosis</p> <p>Robotics for Education</p> <p>Soft Robotics</p> <p>Aerial Robots</p> <p>Mobile Robots</p>	<p><u>Rehabilitation Robotics Project:</u></p> <p>ARGO: Active Reciprocated Gait Orthosis</p> <p>Intended for patients who can still apply a certain amount of force with their legs, at least enough to slightly raise up a feet.</p>



Disaster response application to September, 2016 earthquake:



[ALCOR - Vision, Perception and Cognitive Robotics Laboratory](#)

[San Raffaele Hospital - eServices for Life and](#)

Disaster response;
Vision, perception, and learning robots

Health, Surgical

<http://www.tradr-project.eu/>

Programs:
<http://www.hsr.it/research/organization/programs/>

Health		
Centre for Maritime Research and Experimentation	Maritime	Delivering innovative and field tested Science & Technology (S&T) solutions to address defence and security needs

Associations

Innoecho	Marie robots
Inter-University Centre on Integrated Systems for the Marine	Marine robotics, Underwater Acoustics, Underwater Archaeological and biological sites documentation, Data Analysis
Associazione e-living	<p>Information on Association:</p> <p>e-Living Cluster Association (eLCA)</p> <p>Public-private partnership composed of different subjects, Universities, Research Institutes and Companies.</p> <ul style="list-style-type: none"> collect and study the needs of the manufacturing production regarding models, systems and technologies for Ambient Intelligence and Ambient Assisted Living. <p><i>E-Living: ambient assisted living, promoting inclusion, security, safety, well-being and eco-friendliness.</i></p>