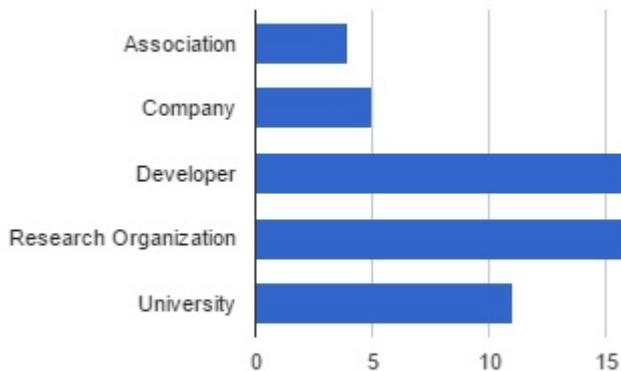


State of Robotics in Germany

Of over 250 euRobotics members, 52 are German organizations, indicating that Germany is invested in SPARC, Horizon2020, and the field of robotics under the EU. Among Robotics Today's 200 members, 47 are German companies, indicating that Germany is also highly involved in the private robotics community. Thus far, we have mapped all of the euRobotics members and have begun to map the Robotics Today members.



euRobotics Membership includes primarily researchers and developers. We have identified companies as developers if they design and produce end products and research organizations if they are involved only in the research and design. Universities are also research organizations, but have been given their own category because their research typically involves a great number of robot categories and industries and may be tied to grants or other government projects. Today we have focused on developers and highlighted research organizations.

DEVELOPERS

Bosch Feuerbach, Germany



Wolfgang Pomrehn, product manager of the APAS assistance systems: "To adapt to changing market requirements quickly, we need new models of human-machine cooperation, where humans should always come first. The APAS assistant, for instance, works directly with the staff without a safety fence, and supports employees in their daily work."

[Press Release](#) [APAS Project](#)

Ottobock Duderstadt and Königsee, Germany



Ottobock's main foci moving forward in research and development are:

Auto-adaptive control, the "electronic intelligence" embedded in the product takes the burden off the user, so that the systems can adapt to different conditions and everyday situations automatically.

Osseointegration, the mounting of prosthesis systems to the long bone via implants. For example, the risk of infection at the site where the skin is penetrated must be minimized by new coating and materials.

[More Information](#)

Locomotec Landsburg am Lech



These machines take over the role of the personal coach and fitness trainer. Driven by an intelligent control system they are capable of supporting and training a person's own mobility based on recent insights from training and exercise theory.

In contrast to the coaching by a human trainer which may require significant time for arranging a training session, coaching by such intelligent devices is possible at any time without preparation.

Running Assistant

DFKI GmbH RIC Bremen



The RIC closely cooperates with the Robotics Group at the University of Bremen. They develop a wide variety of mobile robots, including marine and space robots; search and rescue & security robotics; logistics, production and consumer (LPC); cognitive/consumer robotics; e-mobility & rehabilitation robotic; agricultural robots. They maintain an indexed list of running, completed, and archived projects.

Research Facilities Active Development

Neurorobotics Research Laboratory Berlin



The Neurorobotics Research Laboratory is located at Beuth University of Applied Sciences Berlin. Among other projects, the lab has collaborated with Bayer and Frackenhohl Poulheim to create the modular humanoid robot Myon. Myon was completely conceived, developed and built within the context of the European project ALEAR. Myon consists of five identical humanoid robots. Myon and its four congeners could be furnished with an exterior skin which allows both rational (fall protection, grip surfaces) and emotional (acceptance, reducing fears) functions to be fulfilled.

Myon Robot

“We develop and research morphologies and distributed neural systems for autonomous robots. We are interested specifically in adaptive and robust behaviors. Adaptive here means that the behaviour can adapt to the environment and to the body of the robot. Therefore, it is essential that robots are allowed to move freely within a real environment (which in technical jargon is called *embodiment* and *situatedness*).

The investigated morphologies and controllers are developed in analogy to the nervous system of humans and animals, i.e. the sensorimotor control loops are intended to mimic the structure and dynamics of a brain to a certain abstraction level.”

Fraunhofer IPK Berlin



In collaboration with TU Berlin, Fraunhofer IPK developed the Haptic Walker: “Robot-assisted therapy exercise devices can relieve therapists of heavy, monotonous physical work, while at the same time increasing the intensity of the patients' therapy. Clinical studies on patients treated using robot-assisted therapy exercise devices show a greatly improved rate of success compared to patients treated using conventional therapy...The device also has a built-in man-machine interaction system...The system thus transfers the personal presence, aid and motivational support of the therapist into the patient's home.”

Haptic Walker Rehabilitation Robot

Festo Esslingen



Festo developed the cutting and gripping devices for the CROPS project: “The aim is a configurable, modular and intelligent robot platform, which reliably recognises both the fruit as well as obstacles and other objects.”

Festo has also developed a gripper modeled after an elephants trunk with claims of “hazard-free cooperation between humans and technology” and a machine that “does not have to be carefully protected from humans as conventional industrial robots have to be.”

Bionic Handling Assistant CROPS Project Bionic Learning Network

KUKA Robotics Augsburg



KUKA has developed industrial arm robots, including the LBR iiwa, which stands for "lightweight robot, intelligent industrial work assistant". This light payload industrial arm offers the “highest form of human-robot collaboration in industry” and includes collision detection.

KUKA Entertainment has developed “the world’s first passenger-carrying robot”, a “robocoaster” with PC controls, including a customizable ride experience. The robocoasters have been installed in LEGOLAND amusement parks in Denmark and in Germany.

LBR iiwa KUKA Coaster ...in LEGOLAND DK

OTHER DEVELOPERS

Name	Areas of research	Links to projects and photos
Carl Cloos Schweißtechnik GmbH	Industrial	http://www.cloos.de/de-en/company/locations/

		http://www.cloos.de/shop/media/catalog/category/cache/236x210/QR-CS-10_300dpi_web.png
DFKI Robotics Innovation Center	Mobile intelligent robots in underwater, space; SAR (Search and Rescue) and security robotics; logistics, production and consumer (LPC); cognitive robotics; e-mobility and rehabilitation robotics	http://robotik.dfki-bremen.de/fileadmin/processed/c/0/csm_Asguard_0040_01_73ce56c501.jpg
Fraunhofer Institute for Material Flow and Logistics	Material Flow and Logistics	http://www.iml.fraunhofer.de/en/fields_of_activity/automation_embedded_systems/Products/InBin.html
KARL STORZ GMBH & Co. KG	Medical	
KUKA AG	Industrial	http://www.kuka-robotics.com/en/
Locomotec UG	Fitness and mobility assistants	
Otto Bock HealthCare GmbH	Orthobionic (prosthetics and orthotics) and Bionimobility (wheelchairs)	http://www.ottobock.com/en/comp-any/research-and-development/ http://media.ottobock.com/group-site/media-informations/genium/genium_3_grafik_a_4_download.jpg
Reis GmbH & Co KG Maschinenfabrik	Industrial, manufacturing	http://www.reisrobotics.de/media/image/748/952/396
Robert Bosch GmbH	"Contact-free" collaborative robots, industrial, agricultural	http://www.bosch-presse.de/pressportal/media/dam_images/pi9392/1-pa-22196_img_h720.jpg http://www.bosch-presse.de/pressportal/en/bosch-showcases-contact-free-collaborative-robots-for-the-flexible-factory-61248.html
Roboception GmbH	Software, Hardware, Systems: navigation, perception, manipulation	
Schunk GmbH & Co. KG	Gripping Systems	
Siemens AG	Industrial Automation, Building Technologies, Drive Technology, Energy, Healthcare, Mobility, Financing, Consumer Products, Services	
Synapticon GmbH	Software, embedded systems	
Yaskawa Europe	Handling / Assembly, Painting, Welding / Cutting, Packaging / Palletising	
GÜDEL AG	Industrial Robots	
Pilz GmbH & Co.KG	Safety Automation	
Neurobotic Research Laboratory	Neural control, modular, humanoid, gripper, mobile, perception, self-exploring	http://www.neurorobotik.de/robots_en.php

RESEARCH ORGANIZATIONS

Name	Areas of research	Links to projects and photos
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<u>Autonomous Motion Department / Max-Planck-Institute for Intelligent Systems</u>	Perception-action-learning loops in biological and robotic systems, from nano systems (cells, nano-robots) to macro systems (humans, and humanoid robots)	
<u>Department of Mechanism Theory and Dynamics of Machines - IGM RWTH Aachen</u>	Manufacturing, manipulation, mobile, etc.	http://www.igm.rwth-aachen.de/typo3temp/pics/c0fd3914f4.jpg
<u>DLR (Deutschen Zentrums für Luft- und Raumfahrt)</u>	Intelligent Systems	http://www.dlr.de/rmc/rm/en/desktopdefault.aspx/tabid-3771/#gallery/27951
<u>Fortiss GmbH</u>	Research Project Example: JAMES-Joint Action for Multimodal Embodied Social Systems	
<u>Fraunhofer IFF</u>	(SEE OTHER FRAUNHOFER INST.)	
<u>Fraunhofer Institut für Kommunikation, Informationsverarbeitung und Ergonomie</u>	Communication, Information Processing and Ergonomics FKIE	
<u>Fraunhofer Institute for Intelligent Analysis and Information Systems IAIS</u>	Information Systems, Data, Cognitive Robotics	https://www.iais.fraunhofer.de/en/research/cognitive-robotics.html
<u>Fraunhofer IOSB</u>	Optronics, System Technologies and Image Exploitation	
<u>Fraunhofer IPA, Institute for Manufacturing Engineering and Automation</u>	Automotive, Machinery and Equipment Industry, Electronics and Microsystems, Energy, Medical Engineering and Biotechnology and Process Industry	
<u>FZI Forschungszentrum für Informatik</u>	Service robots, mobile robots,	
<u>Helmholtz Alliance ROBEX at Alfred Wegener Institute AWI</u>	Space and Marine	
<u>Institute for Mining and Metallurgical Machinery, RWTH Aachen</u>	Mining	
<u>Institute of Automatic Control Hannover</u>	Automatic Control, Robotics, Human Motor Control, Machine Learning	
<u>Research Institute for Cognition and Robotics (CoR-Lab)</u>	Humanoid	
<u>Richard Wolf GmbH</u>	Medical	
<u>Wissenschaftliche Gesellschaft Montage Handhabung und Industrierobotik e.V.</u>	Industrial	

ADDITIONAL INFORMATION

Under the EU Commission's Horizon2020 plan was the 7th Framework Programme (FP7), which ran from 2007 to 2013 and included the activity area Information and Communication Technologies (ICT). Cognitive Systems and Robotics was one challenge that fell under this activity area and included the following programs and projects:

[EU-Funded Programs](#) [Archive of FP7 Robotics Projects](#)