Curriculum vitae et studiorum of Erika Ottaviano

EDUCATION

27 April 1998	Mechanical engineer degree cum laude at the University of Cassino by discussing the thesis “Experimental Determination of Robot Workspace by Using a Laser Tracking System” developed at Laboratory of Robotics and Mechatronic of University of Cassino also with Socrates-Erasmus grant in A.Y. 1997-98.
Nov.1998–Oct. 2001	PhD student in Industrial Engineering at University of Cassino. She defended her Ph.D. thesis titled “Progettazione ottimizzata di manipolatori paralleli” (Optimal Design of Parallel Manipulators) on February 28, 2002.

EMPLOYMENT AND MEMBERSHIP IN COMMITEES AND BOARDS

Since February 2023	She got the National Scientific Habilitation as Full Professor from 06/02/2023 to 06/02/2034.
Since 3 November 2022	Associate Professor at the Department of Civil and Mechanical Engineering, University of Cassino.
Since 1 March 2002-	Assistant Professor at the Department of Mechanics, Structures, Environment and Territory, School of Engineering, University of Cassino.
May 2003	Member of Local Committee of the International Congress RAAD03 “Robotics in Alpe-Adria- Danube Region”, held in Cassino in May 7-10 2003.
Since February 6, 2014	She got the National Scientific Habilitation as Associate Professor.
Since April 2004	Member of the IFToMM Commission of Computational Kinematics.
May 2004	Member of Local Committee of the International Congress HMM04 “International Symposium on History of Machines and Mechanisms “, held in Cassino in May 12-15 2004.
2009- 2017	Secretary of the IFToMM Commission of Computational Kinematics.
May 2005	Co-Chair for the Local Committee of the International Conference CK2005 "Computational Kinematics", held in Cassino on May 3-6 2005.
June 2007	Organizer of the meeting "Women in Mechanism and Machine Science: Status and Perspectives" during the IFToMM World Congress a Besancon, France, on June 19, 2007.
September 2008	Member of the Organizing Committee of the International Conference IEEE/RSJ IROS2008 "IEEE/RSJ International Conference on Intelligent and Robots Systems", held in Nice on Sept. 22-26, 2008. In particular, as Chair of Special Events she organized a round table on "Robots in human environment".
2010- 2015	Member of the Scientific Committee for the University Research and Development Center for Disabled People (CUDARI)” of the University of Cassino.
Since April 2016	Member of the Scientific Council for the PhD program titled: ISTITUZIONI, MERCATI E COMPORTAMENTI (ciclo XXXII).
September 2011	Associate Editor for the International Conference IEEE/RSJ IROS2011 "IEEE/RSJ International Conference on Intelligent and Robots Systems", held in San Francisco on Sept. 25-30, 2011.
Since December 2011	Member of the Editorial Board of the International Journal of Advanced Robotic Systems, INTECH Open Access Publisher.
Since November 2012	Editor of the International Journal of Imaging and Robotics (IJIR) (ISSN 2231-525X).
May 2013	Program Committee member for the International conference CK 2013.
Since September 2013	Member of the Editorial Board of the Scientific World Journal, Hindawi Publishing Corporation, Mechanical Engineering.
Since September 2013	Member of the Faculty Board for the PhD in Mechanical, Civil and Biomechanical Engineering of the University of Cassino and Southern Lazio.
Since December 2013	Member of the Editorial Board of African Journal of Engineering, Mechanical Engineering subject area.

2014	Program Committee member for the International conference ICEBE 2014.
Since June 2014	Project evaluator of National projects for the Czech Science Foundation.
Since February 2015	Associate Editor for Mechatronics of the Journal of Applied Sciences, Acta Polytechnica Hungarica.
Since June 2015	Disciplinary Expert for the evaluation of study courses by ANVUR (National Agency for the Evaluation of the University and Research System). Renewal with Resolution no. 295 of 12/21/2021 (she served as ED (Disciplinary Espert) and ES (System Expert)
Since April 2015	Project evaluator for the Romanian National Authority for Scientific Research and Innovation, National Research Council and its Executive Agency for Higher Education, Research, Development and Innovation.
Since November 2015	Project evaluator for the Natural Sciences and Engineering Research Council of Canada (NSERC).
Since September 2016	Editor for American Journal of Engineering and Applied Sciences, Science Publications.
June 2016	Member of the Program Committee of the International Conference Controlo 2016, 12th Portuguese Conference on Automatic Control, June 14-16 2016.
Since April 2017	Project evaluator of French National Research Agency (ANR, http://www.agence-nationale-recherche.fr/en).
2018	Member of the Program Committee of the International Conference Controlo 2018, 13th APCA International Conference on Control and Soft Computing (CONTROLO 2018), São Miguel Island, June 4-6, 2018.
2018	Member of the Scientific Committee of the international conference Helix 2018, International Conference on Innovation, Engineering and Entrepreneurship, Guimarães June 27-29, 2018, organizer of the special session titled "Mechatronics and its Applications for Industry 4.0".
2018	Editor of the book titled "Mechatronics for Cultural Heritage and Civil Engineering (86726336)", Series Title: Intelligent Systems, Control and Automation: Science and Engineering, Huest http://www.springer.com/series/6259
2018	Guest Editor of the Special Issue "Advances in Inspection Robotic Systems", for the Jnl Robotics (https://www.mdpi.com/journal/robotics/special_issues/AIRS).
Since Dec. 2018	ERASMUS Departmental Coordinator for the University of Cassino and Southern Lazio.
Since January 2019	Associate Editor of Medical Robotics, International Journal of Advanced Robotic Systems (IJARS)
Apr. 2021 - Apr. 2024	Member of the ESF College of Expert Reviewers (European Science Foundation).
Since Aug. 2021	Expert reviewer for the projects FAR 2021 – Interdisciplinary Project Mission Oriented for the University of Modena and Reggio Emilia.
2021	Editor of the book titled "Design, Applications, and Maintenance of Cyber-Physical Systems", Pierluigi Rea, Erika Ottaviano, José Machado and Katarzyna Antosz, Release Date: June, 2021, Copyright: © 2021 Pages: 314, DOI: 10.4018/978-1-7998-6721-0, ISBN13: 9781799867210, ISBN10: 1799867218, EISBN13: 9781799867234, ISBN13 Softcover: 978179986722, https://www.igi-global.com/book/design-applications-maintenance-cyber-physical/256643
2022	Editor of the book titled "Innovations in Mechanical Engineering", Editors: José Machado, Filomena Soares, Justyna Trojanowska, Erika Ottaviano, Conference proceedings icieng 2021, Part of the Lecture Notes in Mechanical Engineering book series (LNME), 2020 Springer Nature Switzerland AG. Part of Springer Nature. ISBN: 978-3-030-79165-0, https://link.springer.com/book/10.1007/978-3-030-79165-0.
May 2022	Organizer for the "Special Session SS_04 Cyber-Physical Production Systems: From Design to Applications", International Conference Manufacturing, Poznan, Poland, May 16-19, 2022.
June 2022	Member of the Steering and Scientific Committees of the International Conference Innovation Engineering 2021 (online) and 2022, Guimarães - Portugal

	June 28-30, 2022.
Since July 2022	Panel Member and evaluator for the National Science Center, Poland, Section Physical Science and Engineering.
2022 and 2023	Member of Scientific Committee and Teaching Member for the Mobility Program for Higher Education Students and Staff funded by the Erasmus+ Program, under Key Action 1: Individual Mobility for Learning Purposes (KA131) - Blended Intensive Programs (BIP) titled “Cyber-Physical Systems Design in the context of Industry 4.0”.
Since November 2022	Member of the evaluation panel P101 Mechanical Engineering at the Czech Science Foundation.
Since December 2022	Chair of the International Team of Experts the National Science Center, Poland, Section Physical Science and Engineering.
Since December 2023	Member of the NATO Science for Peace and Security (SPS) Programme's Independent Scientific Evaluation Group' (ISEG).

Reviewer for the of several indexed Journals, as: Journal of Bionic Engineering; Future Generation Computer Systems; Gait and Posture Information Sciences; Mechatronics; Mechanism and Machine Theory; Mechanics Research Communications; Robotics and Computer Integrated Manufacturing; Robotics and Autonomous Systems; Robotics and Autonomous Systems.

PERIODS OF STUDY/RESEARCH ABROAD

Aug.-Sept. 1995	Period of study at Technical University of Ostrava – VSB, Faculty of Material and Metallurgic Engineering (Czech Rep.) with Tempus grant.
August 1997	Period of study at the City University in London (UK).
Sept.–1997	Period of study at Polytechnic of Valencia (Spain) with Socrates-Erasmus grant.
Dec.1999-June. 2000	Period of study at the Laboratory of Robotics, Department of Mechanical Engineering, Laval University, Quebec, Canada during the Ph.D.
Jan. 2001	Period of study at Field and Space Robotics Laboratory, Dept. of Mechanical Engineering, Massachusetts Institute of Technology, Cambridge (USA).
May 2001	Period of study at Instituto de Robòtica y Informàtica Industrial of Barcelona (Spain) within the frame of 2001-2002 bilateral CNR-CSIC agreement.
June- 2002	Period of study at Instituto de Robòtica y Informàtica Industrial of Barcelona (Spain) within the frame of 2001-2002 bilateral CNR-CSIC agreement.
June 2003	Period of study at Instituto de Robòtica y Informàtica Industrial of Barcelona (Spain) within the frame of 2001-2002 bilateral CNR-CSIC agreement.
Sept. 2003	Period of study at Institute for Engineering Mathematics Geometry and Computer Science, University of Innsbruck, Austria.
Dec. 2003	Period of study at Panamerican University of Mexico City, Mexico.
May 2004	Period of study at Mechanical Eng. Dept .at University of San Juan, Argentina.
June 2004	Period of study at Informatics Institute of Slovak Academy of Science (Slovak), within the frame of bilateral CNR SAV- CNR agreement.
July 2004	Period of study at National University of Mechanical Engineering in Lima, Peru.
Sept. 2004	Period of study at INRIA, Sophia Antipolis, France.
Nov. 2004	Period of study at Instituto de Robòtica y Informàtica Industrial of Barcelona (Spain) within the frame of 2003-2004 bilateral CNR-CSIC agreement.
Dec. 2004	Period of study at IRCCyN – CNRS, Ecole Centrale de Nantes, Nantes, France.
Oct 2005	Period of study at Institute for Engineering Mathematics Geometry and Computer Science, University of Innsbruck, Austria.
Dec. 2005	Period of study at INRIA, Sophia Antipolis, France.
Nov. 2006	Period of study at Instituto de Robòtica y Informàtica Industrial Barcelona (Spain)
July 2007	Period of study at Instituto de Robòtica y Informàtica Industrial Barcelona (Spain)
Apr. 2008	Period of study at University of Castilla-La Mancha, Ciudad Real, Spain.
July 2009	Period of study at Institute for Engineering Mathematics Geometry and

	Computer Science, University of Innsbruck, Austria.
Feb. 2010	Period of study at LMS: Laboratoire de Mécanique de Solides University of Poitiers, France.
Feb. 2011	Period of study at Institut de Recherche en Communications et en Cybernétique de Nantes., ECOLE CENTRALE DE NANTES Nantes, France.
Sept 2012	Period of study at University of the Basque Country, Bilbao, Spain.
Sept 2013	Period of study at Polytechnic of Valencia, Spain.
May 2014	Period of study at Polytechnic of Valencia, Spain.
May 2015	Period of study at Institute for Engineering Mathematics Geometry and Computer Science, University of Innsbruck, Austria.
July 2015	Visiting Professor at the School of Industrial Engineering, University of Castilla-La Mancha, Campus of Toledo, Spain.
January 2019	Period of study at the Silesian University of Technology, Gliwice, Poland.
June 2019	Period of study at the Silesian University of Technology, Gliwice, Poland.

LECTURES

6 April 2000	She gave the lecture titled “Grasp Force Control in Two-Finger Grippers with Pneumatic Actuation” at the Department of Mechanical Engineering, Laval University, Quebec, Canada.
14 April 2000	She gave the lecture titled “Mechanical Characteristics and Optimum Design of CAPAMAN (Cassino Parallel Manipulator)” at the Centre for Intelligent Machines, McGill University, Montreal, Canada.
16 September 2002	She gave the lecture titled “Design Considerations on Parallel Manipulators” at Queretaro University, Mexico.
14 November 2002	She gave the lecture titled “Experience, Teaching, and Research at LARM, University of Cassino, Italy”, at Polytechnic of Braunschweig, Germany.
15 November 2002	She gave the lecture titled “Design Considerations on Parallel Manipulators”, presso il Politecnico di Braunschweig, Germania.
2 December 2003	She gave the lecture titled “CaTraSys (Cassino Tracking System): a wire parallel architecture for the determination of position and orientation of moving objects” e “CaPaMan (Cassino Parallel Manipulator): a 3-DOF spatial parallel architecture”, at Panamerican University, Mexico city, Mexico
23 November 2006	She gave the seminar “LARM Research Activities on Cable-Based Parallel Manipulators”, at IRI: Robotics and Inf. Institute, Polytechnic of Catalunia, Spain.
23 February 2010	She gave the seminar “LARM: Research and Teaching Activities” at LMS: Laboratoire de Mécanique de Solides University of Poitiers, France.
8 February 2011	She gave the seminar “Cable-Based Parallel Manipulators: New Trends and Applications” at at Institut de Recherche en Communications et en Cybernétique de Nantes, France.
24 September 2013	She gave the seminar "Cable-Based Parallel Manipulators: Research Activity and New Trends” at Polytechnic of Valencia, Spain.
26 May, 2015	She gave the seminar “Dynamic analysis of robots” at the Institute for Engineering Mathematics Geometry and Computer Science, University of Innsbruck, Austria.
10 July 2015	She gave the seminar "Research and teaching Activities” at the School of Industrial Engineering, University of Castilla-La Mancha, Toledo, Spain.
24 Oct 2015	She gave the seminar " Cable-driven manipulators: from basics to industrial and non-conventional applications” at DLUT, Dalian, China.
May 2017	She gave the seminar "Cable-driven manipulators, new trends and applications" at IRCCyN-CNRS Ecole Centrale de Nantes, Nantes, France.
31 July 2019	Invited lecture at APESS 12th Asia-Pacific Euro Summer School on Smart Structures Technology at Faculty of Civil Eng. at Sapienza University of Rome, Italy.

GRANTS

Best Paper Award for the article presented at EUCOMES 2018, the 7th European Conference on Mechanism Science, Aachen, Germany, 2018.
Best Paper Award for the article presented at MUSME 2008, the International Symposium on Multibody Systems and Mechatronics San Juan, Argentina, 2008.
Best Paper Award for the article presented in Robotics at CIM dell'IEEE-TTTC International Conference on Automation, Quality and Testing, Robotics, AQTR 2006, Cluj-Napoca, Romania, 2006.
Employed as Engineer by contract for research activities on " Hybrid Serial-Parallel Manipulators" within the project "Prime Prin 2001-02" on February 2002.
Grant by Young Delegate IFToMM Award for the participation to the International Conference ARK 2002, 8th Int. Symposium on Advances in Robot Kinematics, June 24-28, 2002, Caldes de Malavella, Spain.
Grant by Young Delegate IFToMM Award for the participation to the International Conference IFToMM 2004, 11th World Congress in Machine Science and Mechanisms, April 1-4 2004, Tianjin, China.
Grant by Young Delegate IFToMM Award for the participation to the International Conference ARK 2006, 10th International Symposium on Advances in Robot Kinematics, June 25-29 2006, Ljubljana, Slovenia.
Grant by Young Delegate IFToMM Award for the participation to the International Conference IFToMM 2007, 12th World Congress in Machine Science and Mechanisms, June 17-21 2007, Besancon, France.
Grant by Fondo Europeo de Desarrollo Regional. Castilla-La Mancha [2014/14752] through the University of Castilla-La Mancha for a period of research and teaching activity as Visiting Professor during July 2015.

TEACHING, SUPERVISION and ACADEMIC CONTRIBUTIONS

She gave the courses of "Mechanisms Design" for Mechanical Engineering and "Fundamentals of Mechanics of Machinery" for Production Engineering and Mechanical Engineering since 2002/2003. Since 2012 she gives the course of "Mechanics of actuation systems". She gives Lectures within the PhD program of Mechanical and Biomechanical engineering at University of Cassino
She gave the course of "Applied Physics" within the course of Informatics and Statistic Physics for Medical Academy, University of Tor Vergata, Rome, during the A.A. 2002/2003.
She gave a course on "Mechanisms Kinematics for non conventional Robotics", within the Ph.D. Course on Mechatronics at the School of Industrial Engineering, University of Castilla La-Mancha, Ciudad Real, in 2008.
She gave the International course on "Kinematics of Mechanisms for Robotics", at National University of Mechanical Engineering in Lima, Peru, 2004.
She gave the International courses on BS "Introduction to Mechatronics" and MS "Selected problems of Robotics" within the Mechatronics studies, at Silesian University of Technology (SUT) for the A.A. 2020-21, 2021/22, 2022/2023 and 2023/2024 as Visiting Professor.
Since 2003 she has been Tutor and co-Tutor for the development of more than 40 Master Thesis and Bachelor Thesis in the field of Robot Mechanics and Mechanics of Machinery.
Since 1998 she collaborates in the Socrates program within Universities of Braunschweig, Hanover, Valencia, Malaga, New Castle Upon Tyne. Since 2004 she is responsible for the Socrates program within University of Nantes, France. Since 2009 she is responsible for the Erasmus program within the University of Duisburg, Germany. Since 2011 she is responsible for the Erasmus program within the University of Pais Vasco, Bilbao, Spain. Since 2012 she is responsible of the Erasmus programs with University of Minho, Portugal, and Polytechnic of Valencia, Spain. Since 2014 she is responsible of the Erasmus programs with University of Innsbruck, Austria, Izmir Polytechnic, Turkey.
She served as supervisor for the PhD thesis of Eng. Gianni Castelli (2007-2010).
She served as President for the Doctoral Tribunal of the PhD defense by Eng. Francisco Javier López Lombraña, for the PhD thesis titled "Validacion Experimental de la Eficiencia Energetica del Robot Cuadrupedo DOGO II", University of Castilla-La Mancha (UCLM), Toledo, Spain, 21 July 2022.
She served as external referee for the Doctoral Tribunal of the PhD defense by Eng. Elisa Digo, for the PhD thesis titled "Human upper body motion tracking for human-machine interaction in industrial applications", Polytechnic of Turin, Sept. 20, 2022.
She served as external referee for the Doctoral Tribunal of the PhD defense by Eng. Guillermo Rubio Gómez for the thesis titled "On the mechanical design, control and sensorization solution of planar cable driven parallel robots", University of Castilla-La Mancha (UCLM), Toledo, Spain, 31 July 2021.

She served as external referee for the Doctoral Tribunal of the PhD defense by Eng. Soheil Sarabandi for the thesis titled “Solving the Nearest Rotation Matrix Problem in Three and Four Dimensions with Applications in Robotics", Technical University of Catalonia (UPC), Barcelona, Spain, 27 April 2021.
She served as external referee for the Doctoral Tribunal of the PhD defense by Eng. George Krait for the thesis titled "Isolating the Singularities of the Plane Projection of Generic Space Curves and Applications in Robotics”, University of Lorraine, Nancy, France, 04 May 2021.
She served as external referee for the Doctoral Tribunal of the PhD defense by Eng.Patrick Grosh, Technical University of Catalonia (UPC), Barcelona, Spain in 2016.
She was member of the MS defense by Mr. Alvaro Burcio-Crespo at University of Castilla-La Mancha, campus of Toledo, Spain, on July 13, 2015.
She was member of the Doctoral Tribunal of the international PhD defense by Eng. Ivan Gonzalez Luchena of University of Castilla-La Mancha, campus of Ciudad Real, Spain, on July 24, 2015.
She served as external referee for the Doctoral Tribunal of the PhD defense by Eng. Júlia Borràs Sol, Technical University of Catalonia (UPC), Barcelona, Spain in 2012.
She was member of the Doctoral Tribunal of the PhD defense by Eng. Nuria Rosillo Guerrero, Dept. Ingenieria de Sistemas y Automatica, Politecnico di Valencia, Valencia, Spain, on July17, 2009.
She was member of the Doctoral Tribunal of the PhD defense by Eng. Silvia Elizabeth Rodrigo of San Juan University, Argentina, on April 7, 2008.
She was member of the Doctoral Tribunal of the PhD defense by Eng. Maher Baili of IRCCyN – CNRS, Ecole Centrale de Nantes, Nantes, France, on 13 December 2004.
She was member of the Doctoral Tribunal of the PhD defense by Eng. Osvaldo Hugo Penisi of San Juan University, Argentina, on May 27, 2004.

PATENTS

Patent for industrial invention titled “System for inspecting and/or treating large surfaces”, No.: 102022000000458, Date of presentation: 13/01/2022, the patent is extended PCT no. PCT/IT2022/050321, date of presentation 12.12.2022.

RESEARCH TOPICS

Google Scholar data

	All	From 2018
Citations	2672	918
h index	32	17
I10-index	75	31

SCOPUS data

Documents	115
Citation (n) by [m] documents	(1468) by [1123]
h index SCOPUS	25
Co-Authors	95
Author ID	6603447658
ORCID	http://orcid.org/0000-0002-7903-155X

TOPICS

- Robot Mechanics

*workspace analysis *design of parallel manipulators

Papers: 1, 2, 3, 5, 6, 9, 12, 13, 15, 18, 19, 20, 25, 27, 28, 31, 32, 35, 51, 53, 59, 62, 65, 67, 69, 76, 77, 78, 98, 99, 102, 105, 109.

Robot workspace is a fundamental kinematic characteristic from theoretical and practical point of view. It is also important during the design process. The workspace of 3R serial manipulators has been studied and a classification of ring voids has been presented. The workspace of parallel manipulators has been studied. In particular robots designed and built at Laboratory of Robotics and Mechatronics in Cassino, and robots by National Seoul University have been analyzed. The design of parallel manipulators is one of the challenging subjects of Robotics research in the recent years. Indeed, with the development of parallel manipulators for performing a wide range of tasks, the introduction of performance index or criteria, which are used to characterize the manipulator, has become quite obvious. Design procedures for parallel manipulators have been formulated regarding the workspace. Designing a manipulator for a specific task means that the manipulation must be performed inside a prescribed volume. The proposed approach is focused on workspace characteristics, particularly the size and shape of position and orientation workspace. An optimization of design parameters of parallel architectures has been formulated for given workspaces. The algorithm can be considered general and can be easily adapted to other specific architectures by using the Kinematics of any parallel manipulator. The design problem has been formulated as finding the optimum size of an architecture such that its workspace volume is as close as possible to the prescribed one. Indeed, procedures have been proposed for novel optimum designs, by considering position workspace, orientation workspace and a combined optimization. Experimental work has been carried out regarding the workspace by using Markerless measuring system based a cable tracking system, which has been designed and built at the Laboratory of Robotics and Mechatronics in Cassino. The measuring system is capable of operating large displacements and orientation variations of complex movable multi-body systems, and it has been applied for the experimental determination of the workspace of serial and parallel manipulators. The system has been also used for monitoring the human limbs motion capability and ranges.

*parallel manipulators

Papers: 10, 17, 21, 23, 26, 29, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 48, 49, 52, 55, 56, 66, 68, 70, 101, 104.

In the last decade several parallel architectures have been proposed and many prototypes have been built and tested. Great attention has been addressed to the performance evaluation and several analyses have been carried out together with suitable specific or general procedures. Nevertheless, the design problem for prescribed performances has been approached in few cases. Analysis and design considerations for parallel manipulators have been presented. A synthesis problem has been approached for a 3-DOF spatial parallel manipulators. Kinematic properties such as workspace and singularity have been analyzed by considering several architectures of parallel manipulators, which have been designed and built at the Laboratory of Robotics and Mechatronics in Cassino. Singularity analysis has been carried out by considering two different approaches.

*cable-based parallel manipulators

Papers: 66, 81, 88, 89, 90, 91, 92, 94, 95, 106, 107, 110.

Cable-driven robots are a type of parallel manipulators wherein the end-effector is supported in-parallel by *n* cables with *n* tensioning actuators. Indeed, the end-effector is operated by actuators that can release or retract cables. Cable-driven manipulators are structurally similar to parallel ones, but they have additional good properties, such as large workspace, if compared to the workspace of classical parallel manipulators. Moreover, they have few moving parts, which gives good inertial properties, high payload-weight ratio, transportability, and economical construction. Nevertheless, feasible tasks are limited due to main characteristics of the cables. In fact, they can only pull the end-effector but do not push it. Therefore, the workspace analysis and design are different from those that can be referred to parallel manipulators. Design and simulation of cable-based parallel manipulators have been proposed for application in hospital environment. Prototypes have been designed and built with a tension monitoring system for evaluate the cables' tension. The monitoring system was used to both active and passive cable-based architectures.

*mobile robots
Papers: 4, 14, 30, 47, 58, 71, 96, 97, 100, 103, 108.
Hybrid and biped walking machines have been studied and several prototypes have been designed and built. Hybrid robots are composed by legs and wheels to combine main characteristics of both locomotion systems. Main characteristics of the mobile systems prototypes are a simple mechanical design and low-cost and easy running actuation system and components. Basic design and operation characteristics make those prototype to be applied to surveillance, demining, inspection of dangerous or radioactive sites. For the above-mentioned application a low-cost easy operation system is well suited.

- Mechanics of Machinery
*cam transmission
Papers: 24, 50, 57, 60, 61, 64, 72, 73, 74, 75, 84, 87, 111.
Several mechanical devices can be designed to obtain a prescribed motion law of the output element. Among them, cam-follower mechanisms are widely used in modern machinery. These devices can reproduce almost any characteristics of the follower's motion and they are not particularly difficult to design and build. Their manufacturing costs are rather limited, as well as the number and dimensions of moving parts. Design and simulation of cam transmission have been carried out and several test-beds have been settled up for experimental activity. An application of cam transmission is proposed to generate a pulsating blood flow during cardiopulmonary by-pass for cardiac surgery.

Assisting and rehab design
* Synthesis of mechanisms * motion analysis * mobility assistance * rehabilitation
Most representative publications: 134, 141, 142, 143, 144, 146, 155
The research concerns systems for mobility assistance and rehabilitation and is carried out through the definition of analytical models for rigid bodies and flexible ones (cables), the implementation of numerical models and the construction of experimental prototypes, with the aim of designing systems to be used at home with characteristics of ease of use and low costs. In particular, devices have been studied to assist in the change of posture of an individual (Sit-To-Stand), from sitting to standing and vice versa, and cable systems for the semi-passive movement of the upper and lower limbs. The methodologies involve the use of dimensional synthesis through function generators, trajectories and rigid motion design. For the cable systems, a model of continuous deformable elastic cable, or discrete with lumped masses, have been conceived and tested. Operation simulations were carried out for the definition of the implementation and management of the systems; prototype solutions of cable systems have been proposed for experimental validation. For the design of the systems, appropriate motion capture systems were developed, cables based systems with cables, and contactless systems based on cameras.

- Mechanics of manipulation and grasp
mechanics of manipulation force control of the grasping *cosimulation
Papers: :7, 8, 11, 16, 22, 54, 63.
The design problem and the experimental validation of grippers have been studied Two-finger grippers with pneumatic actuation are very common in industrial environment because of their capability to handle objects with similar shape, size and weight through a suitable mechatronic design, low-cost and easy-running components. Moreover, particular attention should be focused to the grasp force when grippers by means of robotic arms must handle delicate objects. Experimental experiences on a force control system for robotic two-finger grippers have been presented. The success of the mechatronic layout and operation is based on suitable integration of the components both in the formulation and design. Significant experimental results have been reported to validate both the mechatronic system and study approach for the proposed force control system for robotic two-finger grippers.

PARTICIPATION IN RESEARCH PROJECTS

- METAFORE project (Methods and instruments for the design of families of robots for medical uses) founded by Italian Ministry MURST in the frame of PRIN 1999-2000;
- "Integrated design of robotic architectures and industrial manipulators" project funded for the years 1998-2001 by the University of Cassino;
- "Optimum design of grasping mechanisms" project funded within a bilateral Italy-Spain agreement for the years 1999-2000 between the department DiMSAT of the University of Cassino, Italy, and Department of Mechanical Engineering of the University of Coruña, Spain;
- "Design of wire parallel measuring architectures for determining robot's characteristics" project funded within a bilateral CNR-CSIC agreement between the department DiMSAT of the University of Cassino, Italy, and Instituto de Robòtica y Informàtica Industrial of Barcellona, Spain, for the years 2001-2002 and 2003-2004;
- "Design of robotic structures for medical applications" project funded within a bilateral CNR-MOS agreement between the department DiMSAT of the University of Cassino, Italy, and Department of Mechanical Engineering of Israel Institute of Technology at Technion City, Israel, for the years 2001-2002.
- "Use and analysis of robots for restoration of historical buildings" project funded within a bilateral agreement between the department DiMSAT of the University of Cassino, Italy, and Polytechnic University of Valencia, Spain, for the years 2002-2003;
- PRIN project on "Design and experimental characterization of polycentric cams", for the years 2003-2005;
- "Design and simulation of microsystems" project funded within a bilateral agreement between the department DiMSAT of the University of Cassino, Italy, and Slovak Academy of Science, Bratislava, Slovakia, for the years 2004-2006.
- "A Mechatronic system based on a cable-driven robot for small scale automation in agriculture", International project funded by the Universidad de Ibagué, Colombia, 2017-2018.
- Sub-Contracting of UCLM- University of Castilla-La Mancha, within the DESDEMONA – DEtection of Steel Defects by Enhanced MONitoring and Automated procedure for self-inspection and maintenance, EU project, Call: RFCS (Research Fund for Coal and Steel) – 2017, Grant number: 800687, 2018-2021.

COORDINATION OF RESEARCH PROJECTS

- Team leader for the research Activity on "A study of Feasibility of a Robotized Deburring for Plastic components", project funded by Italian Company SPV – Soluzioni Plastiche Vittoria, 2006.
- Responsible of the Research Unit of the project funded by da Regione Lazio, ERIS - Estensimetri nanocaricati collocati da Robot per Il monitoraggio delle Strutture monumentali, Gruppi di Ricerca 2020 ERIS - A0375-2020-36484. 2021-2023.
- Co-Director of the Research project funded by NATO Science for Peace and Security Progetto id. G5924 - IRIS – Inspection and security by Robots interacting with Infrastructure digital twinS. 2021-2024.
- Responsible of the Research Unit of the project funded by ERASMUS + 2022-1-ES01-KA220-HED-000089155 MISCE - Mechatronics for Improving and Standardizing Competencies in Engineering Description, 2022-2025.
- Co-Director of the Research project funded by NATO Science for Peace and Security Progetto id. – SPS G6001 - MUCADE - "Multi Cable-Driven Robot for Detecting/Detonating Unexploded Mines and Ordnance". 2023-2026.
- Coordinator for the Research Unit for the ERASMUS + 2022 BIP (Blended Intensive Program) titled: Cyber-Physical Systems Design in the context of Industry 4.0.
- Co-Director of the Research project funded by NATO Science for Peace and Security Progetto id. – Project G6140 - "Advanced Technologies for Physical ResIlience Of cRitical Infrastructures (APRIORI)". 2023-2026.

PUBLICATIONS (the number is for the chronological order)

Papers in Journals ("refereed papers")

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