

## CURRICULUM VITAE

*Marilena Vendittelli*

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### BIBLIOMETRIC INFORMATION

Google Scholar

*Total number of citations: 2157, H-index: 20*

Scopus

*Total number of citations: 1138, H-index: 14, Contemporary H-index: 10*

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### CURRENT POSITION

*Assistant Professor* in Automatic Computer, Control, and Management Engineering Antonio Ruberti, Sapienza - Università di Roma (November 2001–).

### HABILITATIONS

*Associate Professor* Italian National Scientific Habilitation (ASN 2012).

*Professional engineer*, November 1992, School of Engineering, Sapienza - Università di Roma.

### PAST POSITIONS

*Research Fellow*, Department of Computer, Control, and Management Engineering Antonio Ruberti, Sapienza - Università di Roma (1998–2001).

*Postdoctoral Research Fellow (Marie Curie Fellowship)*, LAAS-CNRS, Toulouse, France (1997–1998).

## VISITING POSITIONS

*Visiting Scholar, Courant Institute, New York University NYC, US, (July–August 2012).*

*Visiting Scholar, Robotics Institute, Carnegie Mellon University Pittsburgh, US (Aug.–Dec. 2005).*

*Visiting Scholar, LAAS–CNRS, Toulouse, France (March–September 1995, January 1996).*

## EDUCATION

*Ph.D. in System Engineering, July 1997, Department of Computer, Control, and Management Engineering Antonio Ruberti, Sapienza - Università di Roma.*

*Laurea Degree in Electronic Engineering, July 1992, School of Engineering, Sapienza - Università di Roma.*

## RESEARCH INTERESTS

Mainly in the area of robot motion planning and control, with particular emphasis on:

- Motion planning and control of humanoid robots
- Modeling and control of autonomous aerial vehicles (UAV)
- Collaborative multi-robot exploration of unknown environments
- Task constrained motion planning for redundant robotic systems
- Probabilistic methods for robot motion planning and sensor-based exploration
- Motion planning and control of wheeled mobile robots
- Steering and stabilization of general nonholonomic systems
- Nilpotent approximations of systems with singularities
- Optimal trajectories for mobile robots
- Mobile robots perception and navigation.

## TEACHING

*Fondamenti di Automatica, Laurea in Ingegneria Elettrotecnica, Sapienza - Università di Roma (2015–).*

*Fondamenti di Automatica, Laurea in Ingegneria delle Comunicazioni, Sapienza - Università di Roma (2014).*

*Principles of Optimal Control*, a module of the *System Identification and Optimal Control* course, master of science in Control Engineering, Sapienza - Università di Roma (2013–).

*Modeling and Control of a Quadrotor UAV*, one of the four modules of the *Elective in Robotics* course, master in Artificial Intelligence and Robotics, Sapienza - Università di Roma (2010 –).

*Medical Robotics*, master in Biomedical Engineering, master in Artificial Intelligence and Robotics, Sapienza - Università di Roma (2005–).

*Automatic Control Laboratory*, degree in Automatic Control Engineering, Sapienza - Università di Roma (2001–2006).

*Automatic Control*, master in Business and Automation Engineering, Università di Roma Tre (2003, 2005).

*Automatic Control*, degree in Computer Science Engineering, Università di Roma Tre, degree in Electric Engineering, Sapienza - Università di Roma (1998–2001).

*Automatic Control*, degree in Computer Science Engineering, Sapienza - Università di Roma, Polo di Latina (2000).

*Humanoid robots: modeling, planning and control*, Ph.D. in Ingegneria dell’Informazione, University of Pisa (2015).

*Control of nonholonomic systems*, Ph.D. in System Engineering, Sapienza - Università di Roma (2009).

*Motion planning for multi-body systems*, Ph.D. in System Engineering, Sapienza - Università di Roma (2004, 2006).

#### PARTICIPATION TO RESEARCH PROJECTS

SIMPLEXITY (Symbiotic Human-Robot Solutions for Complex Surface Finishing Operations) funded by EC within H2020 – IA (2015–2019).

COMANOID (Multi-Contact Collaborative Humanoids in Aircraft Manufacturing) funded by EC within H2020 – RIA (2015–2019).

SAPHARI (Safe and Autonomous Physical Human-Aware Robot Interaction) funded by EU within FP7 – IP (2011–2015).

I-MULE funded by the Italian Ministry of Economic Development within the call “Industria 2015: Nuove Tecnologie per il Made in Italy” (2012–2014).

MEMONET (Multirobot Exploration supported by MOBILE ad-hoc NETworks) funded by MIUR (Italian research ministry) within PRIN (2010–2012).

PHRIENDS (Physical Human-Robot Interaction: Dependability and Safety) funded by EU within FP6 – Strep (2006-2009).

Cyberwalk (The CyberCarpet – Enabling Omnidirectional Walking in Virtual Worlds) funded by EU within FP6 – Strep (2004–2006).

PICTURE (Planning and Intelligent Control Techniques for Unstructured Robotics Environments) funded by MIUR within PRIN 2004.

ASPICE (Assistive System for Patients Increase of Communication, ambient control and mobility in absence of muscular Effort) funded by the Italian foundation THELETHON within the call UILDM 2003.

MATRICES (Methodologies and Integration of Subsystems and Technologies for Anthropic Robotics and Locomotion) funded by MIUR within PRIN 2002.

TIGER (Telepresence Instant Groupware for higher Education in Robotics) funded by MIUR within FIRB 2001.

MISTRAL (Methodologies, Applications and Technologies for Anthropic Robotics and Locomotion) funded by MIUR within PRIN 2000.

RAMSETE (Articulated and Mobile Robotics for Services and Technologies) funded by MIUR within PRIN 1998.

#### PROFESSIONAL SERVICES

Member of the Evaluation Panel for EC project proposals of the call H2020-ICT-2015 (Innovation Actions panel), 2015.

*Member of the Evaluation Panel* of Sapienza - University of Rome for internal grants, 2011–2012.

*Member of the National Organizing Committee* of the 18th IFAC World Congress, Milano, Italy, 2011.

*Associate Editor* of the IEEE Transactions on Robotics (2010–2013).

*Member of the Board of the Doctoral Program in System Engineering*, Sapienza - Università di Roma, 2008–.

*Associate Editor* of the IEEE RAS Conference Editorial Board (2008–2013).

*Associate Editor* for the IEEE/RSJ International Conference on Intelligent Robots and Systems (2008–2011).

*Registration Chair* for the 2007 IEEE International Conference on Robotics and Automation, Roma, Italy, April 2007.

## GRANTS

Recipient of two *Postdoctoral Marie Curie Fellowships* in 1996 and 1998, respectively.

*EU COMETT Training Grant, The COMmunity program for Education Teaching and Training* (1995).

## INVITED TALKS

*Vision-based control of humanoid robots*, Women in Robotics II, RSS 2015, Rome, Italy and Robotics Research Jam Session 2015, Pisa, Italy (2015).

*Data fusion and sensing for humanoids locomotion and physical interaction*, Humanoids15 Workshop on Proprioceptive and Exteroceptive Data Fusion for State Estimation and Whole-Body Control of Humanoid Robots, Seoul, Korea (2015).

*Roll, walk, manipulate: (short stories on) the elective affinity of motion planning and control*, Workshop Gepetto in honor of Jean-Paul Laumond 60 years anniversary, Toulouse, France (2013).

*Vision-based Localization and Control for the Humanoid Robot NAO*, LAAS-CNRS, Toulouse, France (2012).

*Vision-based Control of a Fixed-Wing UAV*, Università degli Studi del Sannio, Benevento, Italy (2011).

*Task Constrained Motion Planning: A control-based approach*, LAAS-CNRS, Toulouse, France (2010).

*Nonholonomic Distance to Polygonal Obstacles for a Car-Like Robot of Polygonal Shape*, Carnegie Mellon University, Pittsburgh, USA (2005).

*Stabilization of the General Two-Trailer System*, Università degli Studi di Pisa, Pisa (2000).

*Planning and Control of General Nonholonomic Systems via Nilpotent Approximations*, SISSA, Trieste (2000).

*Visibility Domains in the Car-like Robot Metric*, University of California, Berkeley, USA (1996).

*On-Line Map Building and Navigation for Autonomous Mobile Robots*, LAAS-CNRS, Toulouse, France (1995).

## LIST OF PUBLICATIONS

### INTERNATIONAL JOURNALS

T. Mattioli, M. Vendittelli, “Interaction force reconstruction for humanoid robots,” *IEEE Robotics and Automation Letters*, vol. 2, no. 1, pp. 282-289, 2017. DOI: 10.1109/LRA.2016.2601345,

online since August 2016.

A. Paolillo, A. Faragasso, G. Oriolo, M. Vendittelli, “Vision-based maze navigation for humanoid robots,” *Autonomous Robots*, DOI: 10.1007/s10514-015-9498-0, online since January 2016.

G. Oriolo, A. Paolillo, L. Rosa, M. Vendittelli, “Humanoid odometric localization integrating kinematic, inertial and visual information,” *Autonomous Robots*, vol. 40, no. 5, pp. 867–879, 2016. DOI: 10.1007/s10514-015-9498-0, online since September 2015.

P. Robuffo Giordano, M. Vendittelli, “Shortest paths to obstacles for a polygonal Dubins car,” *IEEE Transactions on Robotics*, vol. 25, no. 5, pp. 1184–1191, 2009.

A. Franchi, L. Freda, G. Oriolo, M. Vendittelli, “The SRG Method: A Decentralized Strategy for Cooperative Robot Exploration,” *IEEE/ASME Transactions on Mechatronics*, vol. 14, no. 2, pp. 163–175, 2009.

P. Robuffo Giordano, M. Vendittelli, J.-P. Laumond, P. Souères, “Nonholonomic Distance to Polygonal Obstacles for a Car-Like Robot of Polygonal Shape,” *IEEE Transactions on Robotics*, vol. 22, no. 5, pp. 1040–1047, 2006.

G. Oriolo, M. Vendittelli, “A stabilization framework for general nonholonomic systems with an application to the plate-ball mechanism,” *IEEE Transactions on Robotics*, vol. 21, no. 2, pp. 162–175, 2005.

M. Vendittelli, G. Oriolo, F. Jean, J.-P. Laumond, “Nonhomogeneous nilpotent approximations for nonholonomic systems with singularities,” *IEEE Transactions on Automatic Control*, vol. 49, no. 6, pp. 261–266, 2004.

Andrea De Luca, M. Vendittelli, *et al.*, “Construction, training and clinical validation of an interpretation system for genotypic HIV-1 drug resistance based on fuzzy rules revised by virological outcomes,” *Antiviral Therapy*, vol. 9, no. 4, 2004.

G. Oriolo, A. De Luca, M. Vendittelli, “WMR control via dynamic feedback linearization: Design, implementation and experimental validation,” *IEEE Transactions on Control Systems Technology*, vol. 10, no. 6, pp. 835–852, 2002.

M. Vendittelli, J.P. Laumond, C. Nissoux, “Obstacle distance for car-like robots,” *IEEE Transactions on Robotics and Automation*, vol. 15, no. 4, pp. 678–691, 1999.

G. Oriolo, G. Ulivi, M. Vendittelli, “Real-time map building and navigation for autonomous robots in unknown environments,” *IEEE Transactions on Systems, Man, and Cybernetics. Part B: Cybernetics*, vol. 28, no. 3, pp. 316–333, 1998.

G. Oriolo, G. Ulivi, M. Vendittelli, “Fuzzy maps: A new tool for mobile robot perception and planning,” *Journal of Robotic Systems*, vol. 14, no. 3, pp. 179–197, 1997.

G. Oriolo, G. Ulivi, M. Vendittelli, “Path planning for mobile robots via skeletons on fuzzy maps,” *Intelligent Automation and Soft Computing*, vol. 2, no. 4, pp. 355–374, 1996.

M. Poloni, G. Ulivi, M. Vendittelli “Fuzzy logic and autonomous vehicles: Experiments in ultrasonic vision,” *Fuzzy Sets and Systems*, vol. 69, no. 1, pp. 15–27, 1995.

#### BOOK CHAPTERS

A. De Luca, G. Oriolo, M. Vendittelli, S. Iannitti, “Planning motions for robotic systems subject to differential constraints,” in B. Siciliano, A. De Luca, C. Melchiorri, G. Casalino (Eds.) *Advances in Control of Articulated and Mobile Robots*, Springer Tracts in Advanced Robotics, vol. 10, pp. 1–38, Springer, Berlin, 2004.

A. De Luca, G. Oriolo, M. Vendittelli, “Control of wheeled mobile robots: An experimental overview,” in *RAMSETE - Articulated and Mobile Robotics for Services and Technologies*, S. Nicosia, B. Siciliano, A. Bicchi, P. Valigi Eds., Springer-Verlag, 2001.

G. Oriolo, G. Ulivi, M. Vendittelli, “Chapter 9: Fuzzy maps: Managing uncertainty in sensor-based motion planning,” in *Applications of Fuzzy Logic: Toward High Machine Intelligence Quotient Systems*, M. Jamshidi Ed., Prentice-Hall, 1996.

#### INTERNATIONAL CONFERENCES AND WORKSHOPS

M. Ferro, A. Paolillo, A. Cherubini, M. Vendittelli, “Omnidirectional humanoid navigation in cluttered environments based on optical flow information,” accepted for presentation at the 2016 IEEE-RAS International Conference on Humanoid Robots, Cancun, Mexico, 2016.

D. Evangelista, F. Iodice, A. Perica, M. Cefalo, E. Magrini, M. Anzidei, M. Vendittelli, “Residual-based interaction force estimation for haptic feedback in teleoperated needle insertion,” 6th Workshop on Computer/Robot Assisted Surgery (CRAS 2016), Pisa, Italy, 2016.

M. Vendittelli, J.-P. Laumond, B. Mishra, “Decidability of robot manipulation planning: three disks in the plane,” *Algorithmic Foundations of Robotics XI*, Springer Tracts in Advanced Robotics, vol. 107, pp. 641–657, 2015.

A. Paolillo, A. Cherubini, F. Keith, A. Kheddar, and M. Vendittelli, “Toward autonomous car driving by a humanoid robot: A sensor-based framework,” 2014 IEEE-RAS International Conference on Humanoid Robots, Madrid, Spain, pp. 451–456, 2014.

M. Cagnetti, P. Mohammadi, G. Oriolo, M. Vendittelli, “Task-oriented whole-body planning for humanoids based on hybrid motion generation,” 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems, Chicago, IL, pp. 4071–4076, 2014.

M. Bellacini, L. Lanari, A. Paolillo, and M. Vendittelli, “Manual guidance of humanoid robots without force sensors: Preliminary experiments with NAO,” 2014 IEEE International Conference on Robotics and Automation, Hong Kong, PRC, pp. 1184–1189, 2014.

- M. Cefalo, G. Oriolo, and M. Vendittelli, “Task-constrained motion planning with moving obstacles,” 2013 IEEE IEEE/RSJ International Conference on Intelligent Robots and Systems, Tokyo, JPN, pp. 5758–5763, 2013.
- G. Oriolo, A. Paolillo, L. Rosa, M. Vendittelli, “Vision-based trajectory control for humanoid navigation,” 2013 13th IEEE-RAS International Conference on Humanoid Robots, Atlanta, USA, pp. 118–123, 2013.
- N. Aghakhani, M. Geravand, N. Shahriari, M. Vendittelli, G. Oriolo, “Task control with remote center of motion constraint for minimally invasive robotic surgery,” 2013 IEEE International Conference on Robotics and Automation, Karlsruhe, DEU, pp. 5787–5792, 2013.
- A. Faragasso, A. Paolillo, G. Oriolo, M. Vendittelli, “Vision-based corridor navigation for humanoid robots,” 2013 IEEE International Conference on Robotics and Automation, Karlsruhe, DEU, pp. 3175–3180, 2013.
- M. Cefalo, G. Oriolo, M. Vendittelli, “Planning safe cyclic motions under repetitive task constraints,” 2013 IEEE International Conference on Robotics and Automation, Karlsruhe, DEU, pp. 3792–3797, 2013.
- G. Oriolo, A. Paolillo, L. Rosa, M. Vendittelli, “Vision-based odometric localization for humanoids using a kinematic EKF,” 2012 IEEE-RAS International Conference on Humanoid Robots, Osaka, JPN, pp. 153–158, 2012.
- P. Peliti, L. Rosa, G. Oriolo, M. Vendittelli, “Vision-based loitering over a target for a fixed-wing UAV,” 10th IFAC Symposium on Robot Control, Dubrovnik, HRV, pp. 51–57, 2012.
- C. Toglia, M. Vendittelli, L. Lanari, “Path following for an autonomous paraglider,” 49th IEEE Conference on Decision and Control, Atlanta, GA, USA, pp. 4869–4874, 2010.
- M. Vendittelli, C. Toglia, L. Lanari, “Dynamics and control of a paraglider for planetary exploration,” 61st International Astronautical Congress, pp. 2166–2172, Prague, CZ, 2010.
- G. Oriolo, M. Vendittelli, “A control-based approach to task-constrained motion planning,” 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis, MO, USA, 2009.
- A. Franchi, L. Freda, G. Oriolo, L. Marchionni, M. Vendittelli, “Decentralized cooperative exploration: Implementation and experiments,” 10th International Conference on Intelligent Autonomous Systems, Baden Baden, Germany, 2008
- A. Franchi, L. Freda, G. Oriolo, M. Vendittelli, “A Decentralized Strategy for Cooperative Robot Exploration,” *First International Conference on Robot Communication and Coordination*, Athens, Greece, 2007.
- A. Franchi, L. Freda, G. Oriolo, M. Vendittelli, “A Randomized Strategy for Cooperative Robot Exploration,” *2007 IEEE International Conference on Robotics and Automation*, Roma, Italy, 2007.



- P. Robuffo Giordano, M. Vendittelli, “The Minimum-Time Crashing Problem for the Dubins Car,” *8th International IFAC Symposium on Robot Control*, Bologna, Italy, 2006.
- F. Jean, G. Oriolo, M. Vendittelli, “A globally convergent steering algorithm for regular nonholonomic systems,” *44th Conference on Decision and Control*, Sevilla, SP, 2005.
- L. Freda, G. Oriolo, M. Vendittelli, “Probabilistic strategies for sensor-based exploration,” *9th International Symposium on Robotics with Applications*, Sevilla, SP, 2004.
- G. Oriolo, M. Vendittelli, L. Freda, G. Troso, “The SRT method: Randomized strategies for exploration,” *2004 IEEE International Conference on Robotics and Automation*, New Orleans, LA, pp. 4688-4694, 2004
- G. Oriolo, M. Vendittelli, A. Marigo, A. Bicchi, “From nominal to robust planning: the plate-ball manipulation system,” *2003 IEEE Int. Conf. on Robotics and Automation*, Taipei, Taiwan, May 12–17, 2003.
- A. De Luca, G. Oriolo, L. Paone, P. Robuffo Giordano, M. Vendittelli, “Visual-based planning and control for nonholonomic mobile robots,” *10th IEEE Mediterranean Conference on Control and Automation*, Lisbon, P, 2002.
- T. Sartini, M. Vendittelli, G. Oriolo, “A resolution-adaptive strategy for probabilistic motion planning,” *9th International Symposium on Robotics with Applications*, Orlando, FL, 2002.
- G. Oriolo, M. Ottavi, M. Vendittelli, “Probabilistic motion planning for redundant robots along given end-effector paths,” *2002 IEEE/RSJ International Conference on Intelligent Robots and System*, Lausanne, CH, pp. 1657–1662, 2002.
- G. Oriolo, M. Vendittelli, “Robust stabilization of the plate-ball manipulation system,” *2001 IEEE International Conference on Robotics and Automation*, Seoul, KR, pp. 91–96, 2001.
- A. De Luca, G. Oriolo, M. Vendittelli, “Stabilization of the unicycle via dynamic feedback linearization,” *6th IFAC Symposium on Robot Control*, Vienna, A, pp. 337–344, 2000.
- M. Vendittelli, G. Oriolo, “Stabilization of the general two-trailer system,” *2000 IEEE International Conference on Robotics and Automation*, San Francisco, CA, pp. 1817–1823, 2000.
- M. Vendittelli, J.P. Laumond and P. Souères, “Shortest paths to obstacles for polygonal car-like robots,” *38th IEEE Conference on Decision and Control*, Phoenix, AZ, pp. 17–22, 1999.
- M. Vendittelli, G. Oriolo and J.P. Laumond, “Steering nonholonomic systems via nilpotent approximations: The general two-trailer system,” *1999 IEEE International Conference on Robotics and Automation*, Detroit, MI, pp. 823–829, 1999.
- M. Vendittelli, J.P. Laumond and G. Oriolo, “Nilpotent approximation of nonholonomic systems with singularities: A case study,” *4th IFAC Nonlinear Control Systems Design Symposium*, Enschede, NL, pp. 777–782, 1998.

J.P. Laumond, C. Nissoux and M. Vendittelli, “Obstacles distances and visibility for car-like robots moving forward,” *1998 IEEE International Conference on Robotics and Automation*, Leuven, B, pp. 33–39, 1998.

M. Vendittelli and J.P. Laumond, “Visible positions for a car-like robot amidst obstacles,” *2nd Workshop on Algorithmic Foundation of Robotics*, Toulouse, F. Also in *Algorithms for Robotic Motion and Manipulation*, J.P. Laumond and M. Overmars Eds., A. K. Peters, 1997.

F. Gambino, G. Ulivi and M. Vendittelli, “The transferable belief model in ultrasonic map building,” *6th IEEE International Conference on Fuzzy Systems*, Barcelona, ES, pp. 601–608, 1997.

G. Fortarezza, G. Oriolo, G. Ulivi, M. Vendittelli, “A mobile robot localization method for incremental map building and navigation,” *3rd International Symposium on Intelligent Robotic Systems (SIRS’95)*, Pisa, I, pp. 57–65, 1995.

G. Oriolo, G. Ulivi, M. Vendittelli, “On-line map building and navigation for autonomous mobile robots,” *1995 IEEE International Conference on Robotics and Automation*, Nagoya, J, pp. 2900–2906, 1995.

G. Oriolo, G. Ulivi, M. Vendittelli, “Path planning via skeletons on grey-level maps,” *3rd Mediterranean Symposium on New Directions in Control and Automation*, Limassol, CY, vol. 2, pp. 307–314, 1995.

G. Oriolo, G. Ulivi, M. Vendittelli, “Motion planning with uncertainty: Navigation on fuzzy maps,” *4th IFAC Symposium on Robot Control (SYROCO’94)*, Capri, I, pp. 71–78, 1994.

G. Oriolo, G. Ulivi, M. Vendittelli, “Potential-based motion planning on fuzzy maps,” *2nd European Congress on Intelligent Techniques and Soft Computing (EUFIT’94)*, Aachen, D, pp. 731–735, 1994.

#### TECHNICAL REPORTS

C. Toglia, M. Vendittelli, “Modeling and motion analysis of autonomous paragliders,” Tech. Rep. no. 5/2010, Dipartimento di Informatica e Sistemistica, 2010.

Jean F., Long R., Oriolo G., and Vendittelli M., “An approximate algorithm for nonholonomic motion planning,” Tech. Rep. no. 651, Ecole Polytechnique, Centre de Mathématiques Appliquées, 2009.

R. Antoniol, M. Vendittelli, “Localization of Mobile Robots Using Ultrasonic Sensors,” *DIS Working Paper 37 - 96*, Dicembre 1996.

#### NATIONAL CONFERENCES

M. Cefalo, L. Lanari, G. Oriolo, M. Vendittelli, “The REAL Lab: Remote experiments for active learning,” *XLI AICA Annual Congress*, Trento, IT, 2003.

M. Poloni, G. Ulivi, M. Vendittelli, "Sonar scene reconstruction using fuzzy logic," 36th Annual ANIPLA Conference - AUTOMATION 1992, Genova, I, pp. 324-334, 1992.