Curriculum Vitae
Fabio Ruggiero

Personal information

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Biosketch

FABIO RUGGIERO is Associate Professor of Control and Robotics in the Department of Electrical Engineering and Information Technology at the University of Naples Federico II. Fabio Ruggiero is the reference of the Dynamic Manipulation and Legged Robotics (DynLeg) research topic within the PRISMA Lab (www.prisma.unina.it), coordinated by Prof. Bruno Siciliano. Fabio Ruggiero's research interests include model-based control design of robotic systems. In particular, his studies are specialized on control strategies for dexterous, dual-hand, and nonprehensile robotic manipulation, unmanned aerial vehicles (also equipped with small-scale robot arms for aerial manipulation, transportation, and cooperation with other vehicles), legged robots, and human-robot force interaction. He has co-authored/co-edited 2 books, 28 international journal papers, and more than 70 conference papers/book chapters. He has delivered more than 15 invited lectures and seminars at institutions worldwide and has received several awards, including the I-RAS Chapter "Fabrizio Flacco" Young Author Best Paper Award 2015. He is a Senior member of IEEE and IEEE Robotics and Automation Society. From 2023 he is the Chair of the IEEE Italy RAS Chapter. He has been Associate Editor for the IEEE Robotics and Automation Letters and is currently Associate Editor for the IEEE Transactions on Robotics. He has been a Program Committee member of several conferences and workshops, and he was a co-organizer and co-chair of the 10th International Workshop on Human Friendly Robotics. Fabio Ruggiero has been involved in more than 10 European/Italian research projects. In particular, he has been project/local investigator in three Italian projects, Workpackage Leader within the H2020 HARMONY European project, and an Early Stage Researcher supervisor within the MSC ITN AERO-TRAIN European project. He raised more than 1.2M EUR as local share for the European/Italian projects.

Actual Position

From Dec 2022	Associate Professor for the Department of Electrical Engineering and Information Technology of University of Naples Federico II.

Past Positions

Dec 2019 - Dec 2022	Assistant Professor (tenure track) for the Department of Electrical Engineering and Information Technology of University of Naples Federico II.
Dec 2016 - Dec 2019	Assistant Professor (fixed term) for the Department of Electrical Engineering and Information Technology of University of Naples Federico II.
Jan 2016 - Dec 2016	Fixed-term researcher for CREATE Consortium (www.create.unina.it): scientific and technical support for FP7 Ideas ERC RoDyMan (www.rodyman.eu) project.
Jan 2015 - Dec 2015	Project collaborator for CREATE Consortium, in scientific and technical support for the European FP7 Sherpa integrating project.
Nov 2014 - Dec 2014	Project collaborator for CREATE Consortium, in scientific and technical support for the European FP7 Ideas ERC RoDyMan project.
Nov 2012 - Oct 2014	Research Associate (Post-doc) at University of Naples Federico II, with a fellowship in "*Modeling and control (in free space and in contact with the environment) of flying robots equipped with a robotic arm*", funded by the European EU FP7 ARCAS project.
Dec 2010 - Oct 2012	Post-doc position at University of Naples Federico II, with a fellowship in "*Sensor data acquisition and fusion for the visual servoing of Micro Aerial Vehicles*", funded by the European EU FP7 AIRobots project.
Nov 2007 - Oct 2010	Ph.D. student in Computer Science and Automation Engineering, at Univeristà degli Studi di Napoli Federico II, under the supervision of Dr. V. Lippiello. Fabio Ruggiero ranked first in the competition test for the Ph.D. position.
Sep 2009 - Mar 2010	Visiting scholar at Department of Mechanical Engineering of Northwestern University, Evanson, Illinois (USA), under the supervision of Prof. K.M. Lynch.

Academic qualifications

3 Jun 2022 - 3 Jun 2032	Italian Scientific Qualification as Full Professor (prima fascia, art. 16, comma 1, Legge 240/10) for the 09/G1 academic recruitment field in "*Systems and Control Engineering*".
15 Oct 2018 - 15 Oct 2024	Italian Scientific Qualification as Associate Professor (seconda fascia, art. 16, comma 1, Legge 240/10) for the 09/G1 academic recruitment field in "*Systems and Control Engineering*".
21 Dec 2010	Ph.D degree in Computer Science and Automation Engineering obtained at Università degli Studi di Napoli Federico II. Thesis: "*Grasp and manipilation of objects with a multi-fingered hand in unstructured environments*". Advisor: Dr. V. Lippiello. Received evaluation: top marks.
30 Oct 2007	Laurea degree (M.Sc.) in Automation Engineering, obtained at University of Naples Federico II. The thesis concerned "*Visual servoing based on Lie algebra*",in Italian, (B. Siciliano - V. Lippiello). Final mark: 110/110 with honours.
25 Oct 2005	Laurea degree (B.Sc.) in Automation Engineering, obtained at Università degli Studi di Napoli Federico II. The thesis concerned "*Robot programming in manufacturing field*", in Italian, (B. Siciliano). Final mark: 110/110 with honours.
Jul 2002	He attended the high school at "Liceo" specialising in scientific studies "Niccolò Copernico" in Naples. Final mark: 100/100.

Professional Activities

1 Nov 2019- 29 Feb 2020	Consultant for the experimental verification of advanced materials for ATEX drone according to he attached specification 654A3769-SPE-SYSD-006.0, commissioned by ENIProgetti SpA to the research consortium INSTM (OdL nr. 4310291968).
1 Jun 2018- 31 Jul 2018	Consultant for the realization of a feasibility study for innovative technical solutions about the aerial robotic domain, within the project IDEAS (ENI #654A3769-SPE-SYSD-001), commissioned by ENIProgetti SpA to the research consortium INSTM (ref. INSTM ID/DB 1460).

Research projects fund raising

COWBOT

Title: preCision livestOck farming With collaBorative heterOgeneous roboT teams
Date: Oct 2022 - Sep 2025
Funding: 644k EUR (total project funding), 145k EUR (local share)
Funding source: Italian Ministry of University and Researc
Role: Proposer for the local team
Website: https://www.cowbot.unimore.it

HARMONY

Title: Enhancing Healthcare with Assistive Robotic Mobile Manipulation
Date: 1 Jan 2021 - 30 Jun 2024
Funding: 7.1M EUR (total project funding), 827k EUR (local share)
Funding source: European Uninion's Horizon 2020
Role: Co-proposer for the local team
Website: https://harmony-eu.org

PRINBOT

Title: Grapevine Recognition and Winter Pruning Automation Based on Innovative Robots
Date: 29 Aug 2019 - 28 Aug 2022
Funding: 466k EUR (total project funding), 194k EUR (local share)
Funding source: Italian Ministry of University and Research
Role: Proposer for the local team

WELDON

Title: Walking Robots: A Connection Between Legged Robots and Nonprehensile Manipulation
Date: 1 Mar 2019 - 31 Aug 2021
Funding: 80k EUR
Funding source: University of Naples Federico II and Compagnia di San Paolo
Role: Individual proposer
Website: http://www.weldon.unina.it

Research projects participation

Jan 2021 - Dec 2024	MSC ITN AERO-TRAIN. *Role*: Early Stage Researcher supervisor.
Jan 2021 - Jun 2024	H2020 HARMONY. *Role*: Workpackage leader.
Dec 2019 - Nov 2023	H2020 AERIALCORE. *Role*: Component of the research operative unit.
Sep 2019 - Aug 2022	PRINBOT. National project Programmi di Ricerca Scientifica di Rilevante Interesse Nazionale PRIN 2017. *Role*: **Scientific supervisor of the research unit**.
Mar 2019 - May 2021	WELDON. National project Programma STAR - Sostegno Territoriale alle Attività di Ricerca. *Role*: **Principal investigator**.
Apr 2018 - Oct 2020	Proscan. National project PON "Imprese e competitività" 2014-2020, Ministry of Economic Development. *Role*: Component of the research operative unit.
Jan 2018 - Dec 2021	H2020 Hyfliers. *Role*: Component of the research operative unit.
Jan 2017 - Dec 2018	RoMoLo. National project PON "Imprese e competitività" 2014-2020, Ministry of Economic Development. *Role*: Component of the research operative unit.
Jan 2015 - Dec 2015	EU FP7 Sherpa. *Role*: Component of the research operative unit.
Jun 2013 - May 2019	EU FP7 IDEAS RoDyMan (www.rodyman.eu). *Role*: Leader of the Research Task 2 "Dynamic manipulation control".
Dec 2012 - Oct 2014	EU FP7 ARCAS. *Role*: task leader of T4.2 "Control strategies for one flying robot with a manipulator".
Dec 2010 - Nov 2013	EU FP7 AIRobots. *Role*: Component of the research operative unit.
Feb 2008 - Jan 2012	EU FP7 DEXMART. *Role*: Component of the research operative unit.

Main research contributions

The following highlights the main research area in which Fabio Ruggiero gave some contributions. The main problem is briefly described, while the contributions are proposed with reference to the relevant published articles listed below.

3D reconstruction of unknown objects

Performing tasks in unstructured environments is a challenging robotic research field. In applications like object fine manipulation, the object's surface must be known to properly plan the coordinated movements of the robotic fingers. In the proposed algorithms, a robot equipped with a calibrated camera, mounted in an eye-in-hand configuration, follows some trajectories around the object to be reconstructed. Several images are acquired along these paths. After some standard image processing operations, an ellipsoid is virtually placed around the object, and it is sampled by points, in turn, interconnected through virtual springs and dampers. These points dynamically shrink toward the ellipsoid's centre and stop when intercepting the so-called visual hull. In this way, it is possible to quickly and accurately reconstruct the objects' surfaces in unstructured environments.
Proposed solutions: [BC-2], [BC-11], [IC-1].

Optimal grasp planning in unstructured environments

Planning optimal grasps means that it should be possible to find some points or surface areas on the object where it is possible to apply some forces by using the fingers of a robotic hand to obtain stable grasps. A grasp is stable when the fingers resist external forces applied to the object. If the object is not known apriori, finding a firm grasp becomes more complicated. A method where the above-described object reconstruction process guides the multi-fingered robotic hand to grab the object in a (sub)optimal configuration is proposed. This method allows performing the object reconstruction process in parallel with the optimal grasp planner. In this way, the total time to complete a grasp is reduced with respect to the methods presented in the literature. Moreover, the movements of the fingers can be compared with the ones performed by the human hand.
Proposed solutions: [IJ-1], [BC-2], [IC-4], [IC-5].

Inverse kinematics algorithm for dexterous manipulation

A well-known inverse kinematics algorithm for robot manipulators has been readapted to perform as a planner and a kinematic controller for dual-arm/hand dexterous manipulation tasks. This method allows assigning the object motion directly and retrieves the movement of the single fingers implicitly. Moreover, in the proposed framework, it is possible to exploit the redundancy of the whole system in contact with the object to ensure dexterity and perform stable grasps. Such a method is employed as a planner when a suitable parallel/force control is employed. A theoretical proof shows how such a parallel controller can handle non-planar surfaces too.
Proposed solutions: [IJ-4], [BC-1], [IC-6], [IC-42].

Robotic catching of thrown objects through a monocular vision system

Catching a thrown object through a robotic system requires several capabilities, like smart sensing, object tracking, motion prediction, online trajectory planning, and motion coordination. In the robotic literature, several papers deal with such a problem and the problem of motion trajectory estimation. Most approaches use a stereo vision system to solve the 3D catching problem or a single camera for the 2D case. Using only one camera can reduce the cost of the equipment. Moreover, the calibration procedure for one camera is more comfortable than in the stereo case. Fabio Ruggiero proposed several solutions to this problem, also considering rolling and bouncing balls.
Proposed solutions: [IJ-3], [IJ-5], [IC-9], [IC-11].

Nonprehensile manipulation techniques

An object is manipulated in a nonprehensile way when it is not caged between the fingertips or the hand's palm. Moreover, the so-called "force closure" constraint does not hold during the manipulation task. This means that the motion can also be performed thanks to unilateral constraints: the part can thus roll, slide and break the contact with the robot manipulating it. Examples of everyday nonprehensile manipulation tasks are pushing objects, folding clothes, carrying a glass on a tray, cooking in a pan, and so on. Nonprehensile manipulation can also be referred to as dynamic when the dynamics of both the object and the robot are essential to accomplishing the desired task.

	A standard approach within the robotics community is to split a complex nonprehensile manipulation task into several subtasks that are easier to deal with individually. Therefore, it is possible to define the so-called “manipulation primitives” like rolling (holonomic and nonholonomic), throwing, bouncing, catching, sliding, etc. The primary goal regarding Fabio Ruggiero’s research is to design a common practical/theoretical framework where each motion primitive can be equipped with a proper motion planner and controller. Survey about nonprehensile manipulation written by Fabio Ruggiero: [IJ-11]. Results of the RoDyMan project: [IJ-14],[BC-8]. Proposed solutions (holonomic rolling): [IJ-2], [IJ-7], [IJ-8], [IJ-15], [IJ-17], [BC-5], [BC-13], [IC-22], [IC-27], [IC-41]. Proposed solutions (nonholonomic rolling): [IJ-10], [BC-14], [IC-20], [IC-25], [IC-26]. Proposed solutions (batting): [BC-4], [IC-21], [IC-24]. Proposed solutions (throwing): [BC-15], [IC-19]. Proposed solutions (sliding and friction-induced manipulation): [BC-12], [IC-28]. Proposed solutions (pushing): [IC-29], [IC-30], [IC-35], [IC-44]. Proposed solutions (dynamic grasp and transportation): [IJ-18], [IJ-26], [IJ-28]. Proposed solution (stretching): [BC-16].
Control of vertical take-off and landing unmanned aerial vehicles, also equipped with small-scale robot manipulators	Dynamic equations of aerial robots are complicated due to both the high instability of the platform and the presence of aerodynamic effects, which are not easy to model. Robustness is still a major problem in UAV control. Attaching a small-scale robot manipulator to such an aerial system makes it straightforward to recognize that the dynamic coupling between the modelling terms becomes even more relevant. Representing the dynamic model of the whole system properly is crucial to developing suitable control laws. However, since most robotic arms placed on the UAVs are often small-size manipulators made up of servomotors, it is often impossible to directly control the joint torques. Hence, Fabio Ruggiero developed a method to control the aerial vehicle and the robotic manipulator separately. The latter can be moved through a standard position-based and/or kinematic controller. At the same time, the former has to compensate for the arm’s movements and translate towards the desired position in the Cartesian space. Therefore, an estimator of generalized external forces (forces plus moments) acting on the aerial vehicle and based on the mechanical momentum of the system is developed. Other techniques dealing with the interaction with the environment have also been developed. A literature review about aerial manipulation is published by Fabio Ruggiero in [IJ-13]. Proposed solutions: [IJ-6], [IJ-12], [IJ-23], [IJ-24], [IJ-25], [BC-7], [IC-10], [IC-12], [IC-14], [IC-18], [IC-36], [IC-46], [IC-48].
Control of quadrotors in case of a propeller failure.	Fabio Ruggiero developed control techniques to deal with a partial or complete failure of a quadrotor’s propellers. The proposed control techniques suppose to turn off also the motor which is opposite to the broken one. In this way, a birotor configuration with fixed propellers is achieved. The birotor is hence controlled to follow a planned emergency trajectory. Proposed solutions: [IC-16], [IC-17], [BC-10].
Control of aerial vehicles for landing on oscillating platforms	Given the dynamic model of a UAV, a set of virtual geometric constraints is imposed on the system. Once these constraints are reached through a feedback control law, it is possible to show that the system exhibits a limit cycle that is the periodic trajectory to track. The work aims to keep the UAV on such a periodic trajectory. It is possible to stabilize the aerial vehicle on this oscillating motion through a modified LQR controller, designed based on a linear periodic system approximating the system dynamics around the desired orbit. Proposed solution: [IC-23].
Stabilization of a wheeled VToL on a pipe	Stabilizing a wheeled unmanned aerial vehicle on a pipe is an application in oil and gas facilities for nondestructive measurements. After the derivation of the dynamic model of the system, a discrete-time nonlinear model predictive controller is designed over a finite horizon. The analysis of the asymptotic stability of the designed controller is carried out. The solution can also be employed for aerial manipulators with snake robots. Proposed solution: [IJ-16].

Area coverage and reconnaissance with UAVs

In literature, UAVs are used as flying cameras for different surveillance tasks such as area coverage and reconnaissance. The most common one is the area coverage, where the agent has to follow a pre-defined path that maximises the area covered by the overseer. These paths depend on the geometry of the area that must be supervised. In reconnaissance problems, one or more UAVs must visit several checkpoints along their routes to the target location. A method where UAVs must fly on a limited map in a reconnaissance mission, avoid collisions with unknown obstacles, and repeatedly visit some points of interest has been designed.
Proposed solution: [IC-47].

Control of redundant robot arms for human-robot interaction

The new generation of robots should be intrinsically able to share the operating environment with humans. Physical interaction often occurs, which may happen at any part of the manipulator's body.

The contact can be intentional (i.e., required for collaborative tasks) or accidental (i.e., unexpected collisions). Suitable control strategies must be adopted to guarantee a safe robot reaction to physical interaction, which may require measuring or estimating exchanged forces and moments. A dynamic controller is designed to accomplish the task without needing exteroceptive sensor information. A rigorous stability analysis is provided to confirm the developed theory.
Proposed solutions: [IJ-9], [BC-6], [BC-9].

Control of biped robots

A compass-like biped robot can go down a gentle slope without the need for actuation through a proper choice of its dynamic parameter and starting from a suitable initial condition. The addition of control actions is requested to generate additional gaits and robustify the existing one. An interconnection and damping assignment passivity-based control, rooted within the port-Hamiltonian framework, is designed to generate further gaits with respect to state-of-the-art methodologies, enlarge the basin of attraction of existing gaits, and further robustify the system against controller discretization and parametric uncertainties. Other developed techniques use fractional-order sliding mode controllers for generic planar biped robots. Fabio Ruggiero is also very interested in the mathematical connection between biped robots and non-prehensile manipulation control.
Review regarding the connection between biped and non-prehensile manipulation control: [IJ-22].
Proposed solutions: [IJ-17], [IJ-20], [IJ-21], [IC-31], [IC-34], [IC-43].

Control of quadruped robots

The main advantage of legged robots is their capability to move through complicated and challenging terrains. The momentum-based observer is a powerful tool for robust control and disturbance rejection due to its simple structure and high performance. The estimator, along with a suitable motion planner for the trajectory of the robot's centre of mass and an optimization problem based on the modulation of ground reaction forces, devises a whole-body controller for the robot. The quadruped is stressed by external disturbances acting indifferently on stance and swing legs. Other control techniques have been developed where quadruped robots perform non-prehensile manipulation actions and interact with the environment (e.g., visually impaired people).
Proposed solutions: [IJ-19], [IJ-27], [IC-38], [IC-40], [IC-45], [IC-49].

Publications

Book editor

[BE-2] B. Siciliano, F. RUGGIERO (eds.), *Robot Dynamic Manipulation. Perception of deformable objects and nonprehensile manipulation control*, Springer Tracts in Advanced Robotics, vol. 144, Springer Nature Switzerland, 2022, ISBN: 978-3-030-93290-9.

[BE-1] F. Ficuciello, F. RUGGIERO, A. Finzi (eds.), *Human Friendly Robotics. 10th International Workshop*, Springer Proceedings in Advanced Robotics, vol. 7, Springer International Publishing, 2018, ISBN: 978-3-319-89326-6.

International journal papers (refereed)

[IJ-28] M. Selvaggio, A. Garg, F. RUGGIERO, G. Oriolo, B. Siciliano, *Non-prehensile object transportation via model predictive non-sliding manipulation control*, in IEEE Transactions on Control Systems Technology, (early access), DOI: 10.1109/TCST.2023.3277224.

[IJ-27] V. Morlando, J. Cacace, F. RUGGIERO, *Online feet potential fields for quadruped robots navigation in harsh terrains*, in Robotics, 12(3), 86, 2023, DOI: 10.3390/robotics12030086.

[IJ-26] R. Subburaman, M. Selvaggio, F. RUGGIERO, *A non-prehensile object transportation framework with adaptive tilting based on quadratic programming*, in IEEE Robotics and Automation Letters, vol. 8, n. 6, pp. 3581–3588, 2023, DOI: 10.1109/LRA.2023.3268594.

[IJ-25] J. Cacace, L. Giampetraglia, F. RUGGIERO, V. Lippiello, *A novel gripper prototype for helical bird diverter manipulation*, in Drones, vol. 7, n. 1, 60, 2023, DOI: 10.3390/drones7010060.

[IJ-24] S.M. Orozco Sotos, F. RUGGIERO, V. Lippiello, *Globally attractive hyperbolic control for the robust flight of an actively tilting quadrotor*, in Drones, vol. 6, n. 12, 373, 2022, DOI: 10.3390/drones6120373.

[IJ-23] S.M. Orozco Sotos, J. Cacace, F. RUGGIERO, V. Lippiello, *Active disturbance rejection control for the robust flight of a passively tilted hexarotor*, in Drones, vol. 6, n. 9, 258, 2022, DOI: 10.3390/drones6090258.

[IJ-22] Y. Farid, B. Siciliano, F. RUGGIERO, *Review and descriptive investigation of the connection between bipedal locomotion and non-prehensile manipulation*, in Annual Reviews in Control, vol. 53, pp. 51-69, 2022, DOI: 10.1016/j.arcontrol.2022.04.009.

[IJ-21] Y. Farid, F. RUGGIERO, *Finite-time extended state observer and fractional-order sliding mode controller for impulsive hybrid port-Hamiltonian systems with input delay and actuators saturation: Application to ball-juggler robots*, in Mechanism and Machine Theory, vol. 167, 104577, 2022, DOI: 10.1016/j.mechmachtheory.2021.104577.

[IJ-20] Y. Farid, F. RUGGIERO, *Finite-time disturbance reconstruction and robust fractional-order controller design for hybrid port-Hamiltonian dynamics of biped robots*, in Robotics and Autonomous Systems, vol. 144, 103836, 2021, DOI: 10.1016/j.robot.2021.103836.

[IJ-19] V. Morlando, A. Teimoorzadeh, F. RUGGIERO, *Whole-body control with disturbance rejection through a momentum-based observer for quadruped robots*, in Mechanism and Machine Theory, vol. 164, 104412, 2021, DOI: 10.1016/j.mechmachtheory.2021.104412.

[IJ-18] M. Selvaggio, J. Cacace, C. Pacchierotti, F. RUGGIERO, P. Robuffo Giordano, *A shared-control teleoperation architecture for nonprehensile object transportation*, in IEEE Transactions on Robotics, vol. 38, n. 1, pp. 569-583, 2022, DOI: 10.1109/TRO.2021.3086773. **Finalist for the "Fabrizio Flacco" Young Author Best Paper Award 2021**.

[IJ-17] P. Arpenti, F. Ruggiero, V. Lippiello, *A constructive methodology for the IDA-PBC of underactuated 2-DoF mechanical systems with explicit solution of PDEs*, in International Journal of Control, Automation and Systems, vol. 20, pp. 283-297, 2022, DOI: 10.1007/s12555-020-0839-1.

[IJ-16] S. Zhao, F. RUGGIERO, G.A. Fontanelli, V. Lippiello, Z. Zhu, B. Siciliano, *Nonlinear model predictive control for the stabilization of a wheeled unmanned aerial vehicle on a pipe*, in IEEE Robotics and Automation Letters, vol. 4, n. 4, pp. 4314-4321, 2019, DOI: 10.1109/LRA.2019.2931821.

[IJ-15] D. Serra, F. RUGGIERO, A. Donaire, L.R. Buonocore, V. Lippiello, B. Siciliano, *Control of nonprehensile planar rolling manipulation: A passivity-based approach*, in IEEE Transactions on Robotics, vol. 35, n. 2, pp. 317-329, 2019, DOI: 10.1109/TRO.2018.2887356.

[IJ-14] F. RUGGIERO, A. Petit, D. Serra, A.C. Satici, J. Cacace, A. Donaire, F. Ficuciello, L.R. Buonocore, G.A. Fontanelli, V. Lippiello, L. Villani, B. Siciliano, *Nonprehensile manipulation of deformable objects: Achievements and perspectives from the RoDyMan project*, in IEEE Robotics & Automation Magazine, vol. 25, pp. 83-92, 2018, DOI: 10.1109/MRA.2017.2781306.

[IJ-13] F. RUGGIERO, V. Lippiello, A. Ollero, *Aerial manipulation: A literature review*, in IEEE Robotics and Automation Letters, vol. 3, n. 3, pp. 1957-1964, 2018, DOI: 10.1109/LRA.2018.2808541.

[IJ-12] V. Lippiello, G.A. Fontanelli, F. RUGGIERO, *Image-based visual-impedance control of a dual-arm aerial manipulator*, in IEEE Robotics and Automation Letters, vol. 3, n. 3, pp. 1856-1863, 2018, DOI: 10.1109/LRA.2018.2806091.

[IJ-11] F. RUGGIERO, V. Lippiello, B. Siciliano, *Nonprehensile dynamic manipulation: A survey*, in IEEE Robotics and Automation Letters, vol. 3, n. 3, pp. 1711-1718, 2018, DOI: 10.1109/LRA.2018.2801939.

[IJ-10] A. Gutiérrez-Giles, F. RUGGIERO, V. Lippiello, B. Siciliano, *Nonprehensile manipulation of an underactuated mechanical system with second order nonholonomic constraints: The robotic hula-hoop*, in IEEE Robotics and Automation Letters, vol. 3, n. 2, pp. 1136-1143, 2018, DOI: 10.1109/LRA.2018.2792403.

[IJ-9] F. Vigoriti, F. RUGGIERO, V. Lippiello, L. Villani, *Control of redundant robot arms with null-space compliance and singularity-free orientation representation*, in Robotics and Autonomous Systems, vol. 100, pp. 186-193, 2018, DOI: 10.1016/j.robot.2017.11.007.

[IJ-8] A. Donaire, F. RUGGIERO, V. Lippiello, B. Siciliano, *Passivity-based control for a rolling-balancing system: The nonprehensile disk-on-disk*, in IEEE Transactions on Control System Technology, vol. 25, n.6, pp. 2135-2142, 2017, DOI: 10.1109/TCST.2016.2637719.

[IJ-7] V. Lippiello, F. RUGGIERO, B. Siciliano, *The effects of shapes in input-state linearization for stabilization of nonprehensile planar rolling dynamic manipulation*, in IEEE Robotics and Automation Letters, vol. 1, n.1, pp. 492-499, 2016, DOI: 10.1109/LRA.2016.2519147.

[IJ-6] F. RUGGIERO, J. Cacace, H. Sadeghian, V. Lippiello, *Passivity-based control of VTOL-UAVs with a momentum-based estimator of external wrench and unknown dynamics*, in Robotics and Autonomous Systems, vol. 72, pp. 139-151, 2015, DOI: 10.1016/j.robot.2015.05.006.

[IJ-5] P. Cigliano, V. Lippiello, F. RUGGIERO, B. Siciliano, *Robotic ball catching with an eye-in-hand single-camera system*, in IEEE Transactions on Control Systems Technology, vol. 23, n. 5, pp. 1657-1671, 2015, DOI: 10.1109/TCST.2014.2380175.

[IJ-4] F. Caccavale, V. Lippiello, G. Muscio, F. Pierri, F. RUGGIERO, L. Villani, *Grasp planning and parallel control of a redundant dual-arm/hand manipulation system*, in Robotica, vol. 31, n. 7, pp. 1169-1625, 2013, DOI: 10.1017/S0263574713000647.

[IJ-3] V. Lippiello, F. RUGGIERO, B. Siciliano, *3D monocular robotic ball catching*, in Robotics and Autonomous Systems, vol. 61, n. 7, pp. 1615-1625, 2013, DOI: 10.1016/j.robot.2013.06.008.

[IJ-2] J.-C. Ryu, F. RUGGIERO, K. Lynch, *Control of nonprehensile rolling manipulation: Balancing a disk on a disk*, in IEEE Transactions on Robotics, vol. 29, n. 5, pp. 1152-1161, 2013, DOI: 10.1109/TRO.2013.2262775.

[IJ-1] V. Lippiello, F. RUGGIERO, B. Siciliano, L. Villani, *Visual grasp planning for unknown objects using a multi-fingered robotic hand*, in IEEE/ASME Transactions on Mechatronics, vol. 18, n. 3, pp. 1050-1059, 2013, DOI: 10.1109/TMECH.2012.2195500. **2015 I-RAS Young Author Best Paper Award**.

Book chapters (refereed)

[BC-16] J.-T. Kim, F. RUGGIERO, V. Lippiello, B. Siciliano, *Planning framework for robotic pizza dough stretching with a rolling pin*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero (eds.), vol. 144, pp. 229-253, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_9.

[BC-15] A.C. Satici, F. RUGGIERO, V. Lippiello, B. Siciliano, *A coordinate-free framework for robotic pizza tossing and catching*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero (eds.), vol. 144, pp. 207-227, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_8.

[BC-14] A. Gutierrez-Giles, A.C. Satici, A. Donaire, F. RUGGIERO, V. Lippiello, B. Siciliano, *Nonholonomic rolling nonprehensile manipulation primitive*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero (eds.), vol. 144, pp. 159-205, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_7.

[BC-13] A. Donaire, F. RUGGIERO, V. Lippiello, B. Siciliano, *Holonomic rolling nonprehensile manipulation primitive*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero (eds.), vol. 144, pp. 129-157, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_6.

[BC-12] A. Gutierrez-Giles, F. RUGGIERO, V. Lippiello, B. Siciliano, *Pizza-peel handling through a sliding nonprehensile manipulation primitive*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero(eds.), vol. 144, pp. 113-128, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_5.

[BC-11] J.-T. Kim, F. RUGGIERO, V. Lippiello, B. Siciliano, *Smoothed particle hydrodynamics-based viscous deformable object modelling*, in Robot dynamic manipulation. Perception of deformable objects and nonprehensile manipulation control, B. Siciliano and F. Ruggiero (eds.), vol. 144, pp. 73-102, Springer, Cham, 2022. DOI: 10.1007/978-3-030-93290-9_3.

[BC-10] F. RUGGIERO, D. Serra, V. Lippiello, B. Siciliano, *Control techniques to deal with the damage of a quadrotor propeller*, in Fault Diagnosis and Fault-tolerant Control of Robotic and Autonomous Systems, A. Monteriu et al. (eds.), vol. 126, pp. 25-42, The Institution of Engineering and Technology, 2020. DOI: 10.1049/PBCE126E_ch2.

[BC-9] J. Cacace, F. RUGGIERO, V. Lippiello, *Hierarchical task-priority control for human-robot co-manipulation*, in Human Friendly Robotics. 12th International Workshop, Springer Proceedings in Advanced Robotics, F. Ferraguti et al. (eds.), vol. 12, pp. 125-138, Springer, Cham, 2020. DOI: 10.1007/978-3-030-42026-0_10.

[BC-8] F. RUGGIERO, J.-T. Kim, A. Gutiérrez-Giles, A.C. Satici, A. Donaire, J. Cacace, L.R. Buonocore, G.A. Fontanelli, V. Lippiello, B. Siciliano, *Nonprehensile manipulation control and task planning for deformable object manipulation: Results from the RoDyMan project*, in Informatics in Control, Automation and Robotics, Lecture Notes in Electrical Engineering , Gusikhin O. and Madani K. (eds), vol. 613, pp. 76-100, Springer, Cham, 2020. DOI: 10.1007/978-3-030-31993-9_4.

[BC-7] F. RUGGIERO, *Decentralized control of aerial manipulators through a momentum-based estimator*, in Aerial Robotic Manipulation. Research, Development and Applications, Springer Tracts in Advanced Robotics, A. Ollero and B. Siciliano (eds), vol. 129, pp. 159-174, Springer, Cham, 2019. DOI: 10.1007/978-3-030-12945-3_11.

[BC-6] F. Vigoriti, F. RUGGIERO, V. Lippiello, L. Villani, *Tracking control of redundant manipulators with singularity-free orientation representation and null-space compliant behaviour*, in Human Friendly Robotics. 10th International Workshop, Springer Proceedings in Advanced Robotics, F. Ficuciello, F. Ruggiero, A. Finzi (eds), vol. 7, pp. 15-28, Springer, Cham, 2019. DOI: 10.1007/978-3-319-89327-3_2.

[BC-5] A. Donaire, M. Crespo, F. RUGGIERO, V. Lippiello, B. Siciliano, *Passivity-based control design and experiments for a rolling-balancing system*, in Informatics in Control, Automation and Robotics, Lecture Notes in Electrical Engineering, Madani K., Peaucelle D., Gusikhin O. (eds), vol. 430, pp. 230-255, Springer, Cham, 2018. DOI: 10.1007/978-3-319-55011-4_12.

[BC-4] D. Serra, F. RUGGIERO, A.C. Satici, V. Lippiello, B. Siciliano, *Time-optimal paths for a robotic batting task*, in Informatics in Control, Automation and Robotics, Lecture Notes in Electrical Engineering, Madani K., Peaucelle D., Gusikhin O. (eds), vol 430, pp. 256-276, Springer, Cham, 2018. DOI: 10.1007/978-3-319-55011-4_13.

[BC-3] L. Villani, F. Ficuciello, V. Lippiello, G. Palli, F. RUGGIERO, B. Siciliano, *Grasping and control of multi-fingered hands*, in Advanced Bimanual Manipulation: Results from the DEXMART Project, in Springer Tracts in Advanced Robotics 80, B. Siciliano (Ed.), pp. 219 – 266, Springer, Heidelberg, D, 2012, DOI: 10.1007/978-3-642-29041-1_5.

[BC-2] V. Lippiello, F. RUGGIERO, B. Siciliano, *Floating visual grasp of unknown objects using an elastic reconstruction surface*, in Robotics Research: The Fourteenth International Symposium, in Springer Tracts in Advanced Robotics 70, C. Pradalier, R. Siegwart and G. Hirzinger (Eds.), pp. 329-344, Springer, Heidelberg, D, 2011, DOI: 10.1007/978-3-642-19457-3_20.

[BC-1] V. Lippiello, F. RUGGIERO, L. Villani, *Inverse kinematics for object manipulation with redundant multi-fingered robotic hands*, in Robot Motion and Control 2009, in Lecture Notes in Control and Information Sciences, Krzysztof Kozlowski (Ed.), pp. 255-264, Springer, Heidelberg, D, 2009, DOI: 10.1007/978-1-84882-985-5_23.

International conference papers (refereed)

[IC-49] V. Morlando, V. Lippiello, F. RUGGIERO, *Tethering a human with a quadruped robot: A guide dog to help visual impaired people*, 31st Mediterranean Conference on Control and Automation, Limassol, Cyprus, 2023 (in press).

[IC-48] S. Roos-Hoefgeest Toribio, J. Cacace, V. Scognamiglio, I. Alvarez, R.C. González de los Reyes, F. RUGGIERO, V. Lippiello, *A vision-based approach for unmanned aerial vehicles to track industrial pipes for inspection tasks*, 2023 International Conference on Unmanned Aircraft Systems, Warsaw, Poland, 2023 (in press).

[IC-47] S. Marcellini, F. RUGGIERO, V. Lippiello, *Nonlinear model predictive control for repetitive area reconnaissance with a multirotor drone*, 2023 International Conference on Unmanned Aircraft Systems, Warsaw, Poland, 2023 (in press).

[IC-46] S. D'Angelo, F. Pagano, F. RUGGIERO, V. Lippiello, *Development of a control framework to autonomously install clip bird diverters on high-voltage lines*, 2023 International Conference on Unmanned Aircraft Systems, Warsaw, Poland, 2023 (in press).

[IC-45] V. Morlando, G. Neglia, F. RUGGIERO, *Drilling task with a quadruped robot for silage face measurements*, 2023 IEEE International Workshop on Measurements and Applications in Veterinary and Animal Sciences, Naples, Italy, 2023 (in press).

[IC-44] F. Bertoncelli, M. Selvaggio, F. RUGGIERO, L. Sabattini, *Task-oriented contact optimization for pushing manipulation with mobile robots*, 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems, Kyoto, Japan, pp. 1639-1646, 2022, DOI: 10.1109/IROS47612.2022.9982177.

[IC-43] P. Arpenti, A. Donaire, F. RUGGIERO, V. Lippiello, *Uniform global exponential stablizing passivity-based tracking controller applied to planar biped robots*, 2022 IEEE/RSJ International Conference on Intelligent Robots and Systems, Kyoto, Japan, pp. 6739-6745, 2022, DOI: 10.1109/IROS47612.2022.9981206.

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[IC-41] A. Teimoorzadeh, A. Donaire, P. Arpenti, F. RUGGIERO, *Robust energy shaping for mechanical systems with dissipative forces and disturbances*, 2022 European Control Conference, London, England, pp. 1409-1414, 2022, DOI: 10.23919/ECC55457.2022.9838430.

[IC-40] V. Morlando, F. RUGGIERO, *Disturbance rejection for legged robots through a hybrid observer*, 30th Mediterranean Conference on Control and Automation, Athens, Greece, pp. 743-748, 2022, DOI: 10.1109/MED54222.2022.9837169.

[IC-39] D. Morra, E. Cervera, L.R. Buonocore, J. Cacace, F. RUGGIERO, V. Lippiello, M. Di Castro, *Visual control through narrow passages for an omnidirectional wheeled robot*, 30th Mediterranean Conference on Control and Automation, Athens, Greece, pp. 551-556, 2022, DOI: 10.1109/MED54222.2022.9837221.

[IC-38] V. Morlando, M. Selvaggio, F. RUGGIERO, *Nonprehensile object transportation with a legged manipulator*, 2022 IEEE International Conference on Robotics and Automation, Philadelphia, USA, pp. 6628-6634, 2022, DOI: 10.1109/ICRA46639.2022.9811810.

[IC-37] G. D'Ago, M. Lefebvre, L.R. Buonocore, F. RUGGIERO, M. Di Castro, V. Lippiello, *Modelling and control of a variable-length flexible beam on inspection ground robot*, 2022 IEEE International Conference on Robotics and Automation, Philadelphia, USA, pp. 8231-8237, 2022, DOI: 10.1109/ICRA46639.2022.9812444.

[IC-36] E. Cuniato, J. Cacace, M. Selvaggio, F. RUGGIERO, V. Lippiello, *A hardware-in-the-loop simulator for physical human-aerial manipulator cooperation*, 20th International Conference on Advanced Robotics, Slovenia, pp. 830-835, 2021, DOI: 10.1109/ICAR53236.2021.9659398.

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[IC-33] Z. Pastori, F. RUGGIERO, V. Lippiello, M. Di Castro, *Bayesian optimization approach to input shaper design for flexible beam vibration suppression*, 21st IFAC World Congress, Germany, pp. 9150-9156, 2020, DOI: 10.1016/j.ifacol.2020.12.2159.

[IC-32] M. Nacusse, P. Arpenti, F. RUGGIERO, V. Lippiello, *Gait generation for underactuated compass-like robots using dissipative forces in the controller*, 21st IFAC World Congress, Germany, pp. 9023-9030, 2020, DOI: 10.1016/j.ifacol.2020.12.2022.

[IC-31] P. Arpenti, F. RUGGIERO, V. Lippiello, *Interconnection and damping assignment passivity-based control for gait generation in underactuated compass-like robots*, 2020 IEEE International Conference on Robotics and Automation, Paris, F, pp. 9802-9808, 2020, DOI: 10.1109/ICRA40945.2020.9196598.

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[IC-29] F. Bertoncelli, F. RUGGIERO, L. Sabattini, *Wheel slip avoidance through a nonlinear model predictive control for object pushing with a mobile robot*, 10th IFAC Symposium on Intelligent Autonomous Vehicles, Gdansk, PL, 2019, DOI: 10.1016/j.ifacol.2019.08.043. **Nominated for the Young Author Best Paper Award**.

[IC-28] A. Gutiérrez-Giles, F. RUGGIERO, V. Lippiello, B. Siciliano, *Closed-loop control of a nonprehensile manipulation system inspired by a pizza-peel mechanism*, European Control Conference, Naples, I, pp. 1580-1585, 2019, DOI: 10.23919/ECC.2019.8796077.

[IC-27] P. Arpenti, D. Serra, F. RUGGIERO, V. Lippiello, *Control of the TORA system through the IDA-PBC without explicit solution of the matching equations*, 3rd IEEE International Conference on Robotic Computing, Naples, I, 2019, DOI: 10.1109/IRC.2019.00069.

[IC-26] D. Serra, J. Ferguson, F. RUGGIERO, A. Siniscalco, A. Petit, V. Lippiello, B. Siciliano, *On the experiments about the nonprehensile reconfiguration of a rolling sphere on a plate*, 26th Mediterranean Conference on Control and Automation, Zadar, HR, pp. 13-20, 2018, DOI: 10.1109/MED.2018.8442769.

[IC-25] A. Gutiérrez-Giles, F. RUGGIERO, V. Lippiello, B. Siciliano, *Modelling and control of a robotic hula-hoop system without velocity measurements*, 20th IFAC World Congress, Toulouse, F, pp. 9808-9814, 2017, DOI: 10.1016/j.ifacol.2017.08.889.

[IC-24] D. Serra, F. RUGGIERO, V. Lippiello, B. Siciliano, *A nonlinear least squares approach for nonprehensile dual-hand robotic ball juggling*, 20th IFAC World Congress, Toulouse, F, pp. 11485-11490, 2017, DOI: 10.1016/j.ifacol.2017.08.1595.

[IC-23] V. Lippiello, F. RUGGIERO, *Orbital stabilization of a VToL UAV for landing on oscillating platforms*, 2016 International Symposium on Safety, Security and Rescue Robotics, Lausanne, CH, pp. 131-138, 2016, DOI: 10.1109/SSRR.2016.7784289.

[IC-22] M. Crespo, A. Donaire, F. RUGGIERO, V. Lippiello, B. Siciliano, *Design, implementation and experiments of a robust passivity-based controller for a rolling-balancing system*, 13th International Conference on Informatics in Control, Automation and Robotics, Lisbon, P, pp. 79-89, 2016, DOI: 10.5220/0005981700790089. **Best Paper Award**.

[IC-21] D. Serra, A.C. Satici, F. RUGGIERO, V. Lippiello, B. Siciliano, *An optimal trajectory planner for a robotic batting task: The table tennis example*, 13th International Conference on Informatics in Control, Automation and Robotics, Lisbon, P, pp. 90-101, 2016, DOI: 10.5220/0005982000900101. **Nominated for the Best Student Paper Award**.

[IC-20] A.C. Satici, F. RUGGIERO, V. Lippiello, B. Siciliano, *Intrinsic Euler-Lagrange dynamics and control analysis of the ballbot*, 2016 American Control Conference, Boston, MA, USA, pp. 5685-5690, 2016, DOI: 10.1109/ACC.2016.7526560.

[IC-19] A.C. Satici, F. RUGGIERO, V. Lippiello, B. Siciliano, *Coordinate-free framework for robotic pizza tossing and catching*, 2016 IEEE International Conference on Robotics and Automation, Stockholm, S, pp. 3932-3939, 2016, DOI: 10.1109/ICRA.2016.7487582.

[IC-18] F. RUGGIERO, M. Trujillo, R. Cano, H. Ascorbe, A. Viguria, C. Peréz, V. Lippiello, A. Ollero, B. Siciliano, *A multilayer control for multirotor UAVs equipped with a servo robot arm*, 2015 IEEE International Conference on Robotics and Automation, Seattle, WA, USA, pp. 4014-4020, 2015, DOI: 10.1109/ICRA.2015.7139760.

[IC-17] V. Lippiello, F. RUGGIERO, D. Serra, *Emergency landing for a quadrotor in case of a propeller failure: A PID approach*, 2014 IEEE/RSJ International Conference on Intelligent Robots and Systems, Chicago, IL, USA, pp. 4782-4788, 2014, DOI: 10.1109/IROS.2014.6943242.

[IC-16] V. Lippiello, F. RUGGIERO, D. Serra, *Emergency landing for a quadrotor in case of a propeller failure: A backstepping approach*, 12th IEEE International Symposium on Safety, Security and Rescue Robots, Toyako-Cho, Hokkaido, J, 2014, DOI: 10.1109/SSRR.2014.7017647.

[IC-15] L.R. Buonocore, V. Lippiello, S. Manfredi, F. Ruggiero, *Effects on packet losses on formation control of unmanned aerial vehicles*, 19th World Congress of the International Federation of Automatic Control, Cape Town, ZA, pp. 1234-1240, 2014, DOI: 10.3182/20140824-6-ZA-1003.02216.

[IC-14] F. RUGGIERO, J. Cacace, H. Sadeghian, V. Lippiello, *Impedance control of VToL UAVs with a momentum-based external generalized forces estimator*, 2014 IEEE International Conference on Robotics and Automation, Hong Kong, C, pp. 2093-2099, 2014, DOI: 10.1109/ICRA.2014.6907146.

[IC-13] V. Lippiello, R. Mebarki, F. RUGGIERO, *Visual coordinated landing of a UAV on a mobile robot manipulator*, IEEE International Symposium on Safety, Security and Rescue Robotics, Linkoping, S, pp. 1-7, 2013, DOI: 10.1109/SSRR.2013.6719338.

[IC-12] V. Lippiello, F. RUGGIERO, *Exploiting redundancy in Cartesian impedance control of UAVs equipped with a robotic arm*, 2012 IEEE/RSJ International Conference on Intelligent Robots and Systems, Vilamoura, P, pp. 3768-3773, 2012, DOI: 10.1109/IROS.2012.6386021.

[IC-11] V. Lippiello, F. RUGGIERO, *Monocular eye-in-hand robotic ball catching with parabolic motion estimation*, 10th International IFAC Symposium on Robot Control, Dubrovnik, HR, pp. 229-234, 2012, DOI: 10.3182/20120905-3-HR-2030.00015.

[IC-10] V. Lippiello, F. RUGGIERO, *Cartesian impedance control of a UAV with a robotic arm*, 10th International IFAC Symposium on Robot Control, Dubrovnik, HR, pp. 704-709, 2012, DOI: 10.3182/20120905-3-HR-2030.00158.

[IC-9] V. Lippiello, F. RUGGIERO, *3D monocular robotic ball catching with an iterative trajectory estimation refinement*, 2012 IEEE International Conference on Robotics and Automation, St. Paul, MN, pp. 3950-3955, 2012, DOI: 10.1109/ICRA.2012.6224994.

[IC-8] J.-C. Ryu, F. RUGGIERO, K.M. Lynch, *Control of nonprehensile rolling manipulation: Balancing a disk on a disk*, 2012 IEEE International Conference on Robotics and Automation, St. Paul, MN, pp. 3232-3237, 2012, DOI: 10.1109/ICRA.2012.6225044.

[IC-7] M. Momeni-K., S.C. Diamantas, F. RUGGIERO, B. Siciliano, *Height estimation from a single camera view*, International Conference on Computer Vision Theory and Applications, Roma, I, 2012.

[IC-6] F. Caccavale, G. Muscio, V. Lippiello, F. Pierri, F. RUGGIERO, L. Villani, *Kinematic control with force feedback for a redundant bimanual manipulation system*, 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems, San Francisco, CA, pp. 4194-4200, 2011, DOI: 10.1109/IROS.2011.6094865.

[IC-5] V. Lippiello, F. RUGGIERO, B.Siciliano, L. Villani, *Human-like visual grasp of unknown objects*, International Conference on Applied Bionics and Biomechanics, Venice, I, 2010.

[IC-4] V. Lippiello, F. RUGGIERO, B. Siciliano, L. Villani, *Preshaped visual grasp of unknown objects with a multi-fingered hands*, 2010 IEEE/RSJ International Conference on Intelligent Robots and Systems, Taipei, ROC, pp. 5894-5899, 2010, DOI: 10.1109/IROS.2010.5650680.

[IC-3] V. Lippiello, F. RUGGIERO, L. Villani, *Floating visual grasp of unknown objects*, 2009 IEEE/RSJ International Conference on Intelligent Robots and Systems, St. Louis, MO, pp. 1290-1295, 2009, DOI: 10.1109/IROS.2009.5354350.

[IC-2] V. Lippiello, F. RUGGIERO, L. Villani, *Exploiting redundancy in closed-loop inverse kinematics for dexterous object manipulation*, IEEE International Conference on Advanced Robotics, Munich, D, 2009.

[IC-1] V. Lippiello, F. RUGGIERO, *Surface model Reconstruction of 3D objects from multiple views*, 2009 IEEE International Conference on Robotics and Automation, Kobe, J, pp. 2400—2405, 2009, DOI: 10.1109/ROBOT.2009.5152652.

National conference papers (refereed)

[NC-5] V. Morlando, M. Selvaggio, F. RUGGIERO, *Robotic non-prehensile object transportation*, 2022 I-RIM Conference, Rome, I, 2022.

[NC-4] F. RUGGIERO, *Latest developments in robotic nonprehensile dynamic manipulation*, Convegno Annuale dei docenti e ricercatori italiani in AUTOMATICA, Roma, I, 2016.

[NC-3] V. Lippiello, F. RUGGIERO, *3D robotic monocular ball catching*, Convegno Annuale dei docenti e ricercatori italiani in AUTOMATICA, Pisa, I, 2011.

[NC-2] V. Lippiello, F. RUGGIERO, B. Siciliano, L. Villani, *Kinematic motion control for visual grasp of unknown objects*, Convegno Nazionale Anipla Motion Control, Milano, I, 2010.

[NC-1] V. Lippiello, F. RUGGIERO, B. Siciliano, L. Villani, *Exploiting redundancy in kinematic motion control for dexterous object manipulation*, Convegno Nazionale Anipla Motion Control, Milano, I, 2010.

Other contributions (not refereed)

F. RUGGIERO, V. Lippiello, A. Ollero, *Introduction to the special issue on aerial manipulation*, IEEE Robotics and Automation Letters, vol. 3, pp. 2734-2737, 2018, DOI: 10.1109/LRA.2018.2830750.

F. Ficuciello, V. Lippiello, F. RUGGIERO, B. Siciliano(speaker), L. VIllani, *Grasping and control of multifingered hands*, International Expert Days organized by Schunk, Hause, 2012.

V. Lippiello, F. RUGGIERO, L. Villani, *Motion coordination of multi-arm and multi-fingered robotic systems*, Control Themes in Hyperflexible Robotic Workcells, F.Basile and P.Chiacchio (Eds.), 2010.

V. Lippiello, F. RUGGIERO, B. Siciliano(speaker), L. Villani, *Fast visual grasp of unknown objects with a multi-fingered hand*, International Expert Days organized by Schunk, Hausen, 2010.

F. Ficuciello, V. Lippiello, F. RUGGIERO, B. Siciliano(speaker), L. Villani, *Grasping unknown objects with robotics hands using vision and touch*, Italian National Meeting SIDRA, Siracusa, 2009.

V. Lippiello, F. RUGGIERO, L. Villani(speaker), *A framework for task description and inverse kinematics of cooperative robot manipulators*, Italian National Meeting SIDRA, Vicenza, 2008.

Ph.D. Thesis

[TH] F. RUGGIERO, *Grasp and manipulation of objects with a multi-fingered hand in unstructured environments*, Ph.D Thesis, Dec 2010.

Awards

ICINCO 2016 Best Paper Award

The paper "*Design, implementation and experiments of a robust passivity-based controller for a rolling-balancing system*", authored by M. Crespo, A. Donaire, F. RUGGIERO, V. Lippiello and B. Siciliano, has received the Best Paper Award at the 13th International Conference on Informatics in Control, Automation and Robotics, held in Lisbon, July 2016.

I-RAS Chapter Young Author Best Paper Award 2015

On September, 9th 2015 at Automatica.it 2015 in Bari, Fabio Ruggiero has received the 2015 I-RAS Young Author Best Paper Award for the paper entitled "*Visual grasp planning for unknown objects using a multifingered robotic hand*", co-authored with Vincenzo Lippiello, Luigi Villani and Bruno Siciliano, published in the IEEE/ASME Transactions on Mechatronics in June 2013. The award is given to an author or co-author of a recent paper published in one of the journals (co-)sponsored by the IEEE Robotics and Automation Society (RAS). The publication date should be during 2013-2014; the author must be a member of I-RAS during 2015; the author's birth date must be later or equal than January, 1st 1980. The IEEE RAS Italian Chapter Young Author Best Paper has been selected by a Committee formed by the Chair of the Chapter and by 4 other IEEE RAS members nominated by the Chair. The Chapter Chair is the President of the Committee, he/she will vote only in case of parity. The 2015 Award Committee was composed by Arianna Menciassi, Daniele Nardi, Gianluca Antonelli, Paolo Rocco and Lucia Pallottino (Chapter Chair and President of the Committee).

Honors

"Fabrizio Flacco" Young Author Best Paper Award 2021 finalist

The paper "*A shared-control architecture for non-prehensile object transportation*", authored by M. Selvaggio, J. Cacace, C. Pacchierotti, F. RUGGIERO and P. Robuffo Giordano, has received the nomination for the "Fabrizio Flacco" Young Author Best Paper Award 2021, issued by the I-RAS Chapter. Young author: Mario Selvaggio.

IAV 2019 Young Author Best Paper Award finalist

The paper "*Wheel slip avoidance through a nonlinear model predictive control for object pushing with a mobile robot*", authored by F. Bertoncelli, F. RUGGIERO and L. Sabattini, has received the nomination for the Young Author Best Paper Award at the 10th IFAC Symposium on Intelligent Autonomous Vehicles, held in Gdansk, Poland, July 2019. Student: Filippo Bertoncelli.

FFABR 2017

Fabio Ruggiero was among the recipients of the FFABR 2017, fund for the ordinary financing of Italian state universities.

ICINCO 2016 Best Student Paper Award finalist

The paper "*An optimal trajectory planner for a robotic batting task: The table tennis example*", authored by D. Serra, A. Satici, F. RUGGIERO, V. Lippiello and B. Siciliano, has received the nomination for the Best Student Paper Award at the 13th International Conference on Informatics in Control, Automation and Robotics, held in Lisbon, July 2016. Student: Diana Serra.

Invited lectures and delivered seminars

17 Jul 2023

F. RUGGIERO, *Aerial robotics (Lesson 2)*, delivered within the international course "Sustainable Ocean Intelligent Autonomous Monitoring", Shanghai Jiao Tong University. 2 hours.

7 Jul 2023

F. RUGGIERO, *Aerial robotics (Lesson 1)*, delivered within the international course "Sustainable Ocean Intelligent Autonomous Monitoring", Shanghai Jiao Tong University. 2 hours.

5 Jul 2023

F. RUGGIERO, *Underwater robotics (Lesson 2)*, delivered within the international course "Sustainable Ocean Intelligent Autonomous Monitoring", Shanghai Jiao Tong University. 2 hours.

3 Jul 2023

F. RUGGIERO, *Underwater robotics (Lesson 1)*, delivered within the international course "Sustainable Ocean Intelligent Autonomous Monitoring", Shanghai Jiao Tong University. 2 hours.

27 Oct 2022

F. RUGGIERO, *Robotic non-prehensile dynamic manipulation. Focus on RoDyMan and HARMONY European projects*, delivered within the "Innovation Village", Città della Scienza, Naples, Italy. 0.5 hours.

22 Sept 2022

F. RUGGIERO, *Robotics. Design of control systems*, delivered within the "Master in Entrepreneurship Innovation Management 2021-2022", Università degli Studi di Napoli Parthenope, Naples, Italy. 8 hours.

20 Sep 2022

F. RUGGIERO, *Mobile Robotics and Collaborative Robotics in Manufacturing*, delivered within the "Aerotech Academy", Leonardo Labs, Naples, Italy. 7 hours.

3-4 Feb 2022

F. RUGGIERO, *Underactuated systems: Applications in robotics*, delivered within the "Winter school of Robotics", Sochi, Russia. 4 hours.

23 Sep 2021

F. RUGGIERO, *Mobile Robotics and Collaborative Robotics in Manufacturing*, delivered within the "Aerotech Academy", Leonardo Labs, Naples, Italy. 7 hours.

11 Jul 2020

F. RUGGIERO, *Nonprehensile Dynamic Manipulation*, delivered within the international workshop "Robotic manipulation: mechatronic tools, modeling, identification and control", held during the 1st Virtual IFAC World Congress, Germany. 0.5 hours.

23 Jan 2019

F. RUGGIERO, *Nonprehensile Robotic Manipulation*, delivered at Università degli Studi di Modena e Reggio Emilia. 1 hour.

31 May 2014

F. RUGGIERO, *External generalized forces estimation in aerial manipulation*, delivered within the international workshop "Aerial robots physically interacting with the environment", held during the 2014 IEEE International Conference on Robotics and Automation, Hong Kong. 0.5 hours.

4 Jul 2013

F. RUGGIERO, *Kalman filter: Theory and applications in robotics* (in Italian), delivered at Dipartimento di Ingegneria Elettrica e Tecnologie dell'Informazione, Università degli Studi di Napoli Federico II, in range of the training course *Corso di alta formazione per specialisti in sistemi e tecnologie di Driver Monitoring*, 3 hours.

10 May 2012 | F. RUGGIERO, *On the catching of thrown balls and the use of redundancy in fine and aerial manipulation tasks*, delivered at the Laboratory for Intelligent Mechanical Systems, Northwestern University. 1 hour.

3 Nov 2010 | F. RUGGIERO, *Fast visual grasp of unknown objects with a multi-fingered hand*, delivered at School of Electrical and Electronic Engineering, University of Manchester. 1 hour.

Journal and conference service

Organizer co-chair | Fabio Ruggiero is an organizer co-chair of the 10th International Workshop on Human-Friendly Robotics (HFR 2017 - www.hfr2017.unina.it), organized on November 6-7, 2017, in Naples, Italy.

Journal Associate Editor | Sice July 2021, Fabio Ruggiero is Associate Editor for the IEEE Transactions on Robotics. From February 2018 to July 2021, Fabio Ruggiero was Associate Editor for the IEEE Robotics and Automation Letters.

Guest Editor | Guest Editor for the special issue entitled “Aerial manipulation” on the IEEE Robotics and Automation Letters, proposed by V. Lippiello, F. RUGGIERO and A. Ollero. The special issue appeared on March 2018.

Conference Associate Editor | 2022 IEEE International Conference on Robotics and Automation. 2021 IEEE International Conference on Robotics and Automation. 2020 IEEE International Conference on Robotics and Automation. 2019 IEEE International Conference on Robotics and Automation. 2018 IEEE International Conference on Robotics and Automation. 2017 IEEE International Conference on Robotics and Automation. 2016 IEEE International Conference on Robotics and Automation. 2015 IEEE International Conference on Robotics and Automation.

Program Committee member | HFR 2021. Automatica.it 2021. 1st International Workshop on Internet of Autonomous Unmanned Vehicles. International Conference on Computer Vision Theory and Applications 2014.

Speaker in conference sessions | 2020 IEEE International Conference on Robotics and Automation. 26th Mediterranean Conference on Control and Automation. Convegno Annuale dei docenti e ricercatori italiani AUTOMATICA 2016. 2016 IEEE International Conference on Robotics and Automation. 2015 IEEE International Conference on Robotics and Automation. 2014 IEEE International Conference on Robotics and Automation. 10th International IFAC Symposium on Robot Control. 2012 IEEE International Conference on Robotics and Automation. International Conference on Computer Vision Theory and Applications 2012. International Conference on Applied Bionics and Biomechanics 2010. International Conference on Advanced Robotics 2009.

Session chair | 18th European Control Conference. 10th International Workshop on Human-Friendly Robotics. 2016 IEEE International Conference on Robotics and Automation. 10th International IFAC Symposium on Robot Control. International Conference on Computer Vision Theory and Applications 2012. International Conference on Applied Bionics and Biomechanics 2010.

Reviewer for international journals | Fabio Ruggiero has been reviewer for papers submitted to the following international journals: Robotics and Automation Magazine, IEEE Transactions on Robotics, IEEE Transactions on Automatic Control, IEEE Transactions on Control Systems Technology, IEEE Robotics and Automation Letters, IEEE Transactions on Aerospace and Electronic Systems, Robotica, Robotics and Computer Integrated Manufacturing, Robotics and Autonomous Systems, Sensors, Nonlinear Dynamics.

Reviewer for international conferences

Fabio Ruggiero has been reviewer for papers submitted to the following international conferences: IEEE International Conference on Robotics and Automation, IEEE/RSJ International Conference on Intelligent Robots and Systems, International IFAC Symposium on Robot Control, IEEE/RSJ International Conference on Advanced Intelligent Mechatronics, International Conference on Applied Bionics and Biomechanics, Symposium on Robot Control, International Conference on Human Robot Interaction.

Ph.D. Tutoring

2021-2024 Student: Simone D'Angelo. Doctorate cycle: XXXVII. Project: Push-and-slide with tilting unmanned aerial manipulators. Tutoring percentage: 50%.

2021-2024 Student: Hameed Ullah. Doctorate cycle: XXXVII. Project: Stabilization and control of aerial manipulators in contact with the environment for on-site measurements. Tutoring percentage: 100%.

2019-2022 Student: Viviana Morlando. Doctorate cycle: XXXV. Project: Model-based control of legged robots. Tutoring percentage: 100%.

2018-2020 Student: Pierluigi Arpenti. Doctorate cycle: XXXIII. Project: Energetic approaches for model-based control of legged robots. Tutoring percentage: 50%.

2014-2016 Student: Diana Serra. Doctorate cycle: XXIX. Project: Model-based control of rolling nonprehensile manipulation primitives and multi-contact robot locomotion. Thesis title: Motion planning and control methods for nonprehensile manipulation and multi-contact locomotion tasks. Tutoring percentage: 50%.

Teaching activities

Summary — Fabio Ruggiero has conducted both main and supplementary teaching activities by carrying out theoretical and experimental lessons, as well as student tutorials.

2021-today Lecturer for the class *"System theory"*, delivered at University of Naples Federico II.

2021-today Lecturer for the class *"Mobile robots"*, delivered at University of Naples Federico II.

2020-today Lecturer for the class *"Fields and service robotics"*, delivered at University of Naples Federico II.

2019-2020 Lecturer for the class *"Robots and automatic solutions"*, delivered at University of Naples Federico II.

2019 Lecturer for the class *"Elements of automatic control"*, delivered at University of Salerno.

2017-2020 Lecturer for the class *"Elements of dynamic systems"*, delivered at University of Naples Federico II.

2011-2016 Teaching assistant for the class *"Elements of dynamic systems"*, delivered by Prof. V. Lippiello, at University of Naples Federico II.

2011 Teaching assistant for the class *"Robot Control"*, delivered by Prof. B. Siciliano, at University of Naples Federico II.

2011 Teaching assistant for the class *"Manipulators"*, delivered by Dr. V. Lippiello, at University of Naples Federico II, in the range of the Second Level Master in Robotics and Intelligent Systems.

2009-2018 Teaching assistant for the class *"Advanced robotics"*, delivered by Prof. B. Siciliano, at University of Naples Federico II.

2009-2010 Teaching assistant for the class *"Elements of industrial robotics"*, in Italian, delivered by Prof. B. Siciliano, at University of Naples Federico II.

2009 Teaching assistant for the class *"Automatica"*, delivered by Prof. L. Villani, at University of Naples Federico II.

2009 Teaching assistant for the class *"Automation systems technologies"*, delivered by Dr. V. Lippiello, at University of Naples Federico II.

Supervision of students during their Bachelor and Master theses

Fabio Ruggiero supervised more than 50 students so far during their practical experiences in finalizing Bachelor and Master theses. This led to the realization of a number of interesting applications in the robotic field. Some examples are namely: the ball catching with a robot manipulator; the control of the position and the orientation of a ball on an actuated plane; the use of model predictive control for nonprehensile manipulation; the robotic pizza peel task; the re-programming commercial vacuum robots; the robotic batting manipulation primitive; the control of hyper-redundant robotic arm for pipe inspections; the simulation of walking robots in dynamic simulation environments; the robot self-collision avoidance; the fault detection of a quadrotor's propeller; the movement of robots through haptic devices, smartphones, and remote game controllers; the stabilization of a disk on another disk and a ball on another ball; the control of a robot through voice commands; the 3D object reconstruction from a mono or a stereo camera system; the bird diverters installation with an aerial manipulator; the use of LIDAR sensors in aerial robotics; the optimal grasp planning; the control of a humanoid robot; the realization of the nonprehensile inverse pendulum task with a robotic arm; the control of the TORA system; the identification of the mathematical model of flexible elements; the implementation of visual techniques for the autonomous landing of a drone on a pipe; and so on.

Some of the above theses had as follow-up the publication of the related results to peer-reviewed international journals and conferences: [IJ-28], [IJ-25], [IC-16], [IC-17], [IC-26], [IC-36], [IC-39].

Personal skills and competences

Mother tongue(s) — **Italian language**

Other language(s) — English language, French language

Self-assessment *European level*(*)

	Understanding		Speaking		Writing
	Listening	Reading	Spoken interaction	Spoken production	
English language	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user	C1 Proficient user
French language	A1 Basic user	B1 Independent user	A1 Basic user	A1 Basic user	A1 Basic user

(*) *Common European Framework of Reference (CEF) level*

Computer skills and competences

Programming languages
- Very good knowledge of MATLAB-SIMULINK environment.
- Good knowledge of the programming language C++.
- Good knowledge of the robot oriented programming languages PDL2 and RAPID.
- Basic knowledge of MATHEMATICA as well as of the programming languages BASIC, PASCAL, FORTRAN.

Middleware — Basic knowledge of ROS (Robot Operating Systems).

Operating systems — Windows. Linux.

Web
- Very good knowledge of both PHP and HTML languages.
- Good knowledge of the CSS language.
- Reasonable knowledge of the SQL database language.
- Basic knowledge of the FLASH language and environment.
- Fabio Ruggiero has very good capabilities in creating, developing and realizing web sites.

21 Nov 2001 — European Computer Driving Licence ECDL.

Fabio Ruggiero is aware that, pursuant to and in accordance with Art. 26 about the law 15/68, mendacious statements, false acts and use of false acts are punishable pursuant to and in accordance with the penal code and special laws. The undersigned allows the use of personal data pursuant to and in accordance with Law 196/03.