Curriculum Vitae Prof. Andrea Maria Zanchettin

Personal data

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Education



Spoken languages

Italian (mother tongue), English (full professional proficiency).

Working experience



MILANO 1863

Associate Professor, 03-10-2019 – present

Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Italy SSD: ING-INF/04 – Automatica (09/G1) Topic: Control and machine learning tools for intelligent human-robot collaboration



Board of the PhD program in Information Technology, 18-03-2022 – present Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Italy



POLITECNICO

MILANO 1863

Tenure-track Assistant Professor (RTDb), 01-10-2016 – 02-10-2019 Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Italy SSD: ING-INF/04 – Automatica (09/G1) Topic: Control tools for intelligent human-robot collaboration

Topic: Safety-oriented motion planning and control for kinematically redundant dual-arm robot



Fixed-term Assistant Professor (RTDa), 01-03-2014 – 30-09-2016

POLITECNICO MILANO 1863

Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Italy SSD: ING-INF/04 – Automatica (09/G1)
Topic: Sensor-based trajectory generation for robotic manipulators



Post-doctoral Research Assistant, 16-01-2012 – 28-02-2014 Politecnico di Milano, Dipartimento di Elettronica, Informazione e Bioingegneria, Italy

Funded by: EU FP7 ROSETTA Project

manipulators

POLITECNICO MILANO 1863



MILANO 1863

Research Assistant, 01-06-2008 – 31-12-2008 Politecnico di Milano, Dipartimento di Elettronica e Informazione, Italy Funded by: Fondazione Politecnico di Milano, in cooperation with Indesit Company Topic: Control of mechanical systems with low-cost sensors

Teaching activities

| 2022/2023 | Course: Automatic Control A, MSc in Mechanical Engineering Role: lecturer, 66 hours |
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| 2021/2022 | Course: Automatic Control A, MSc in Mechanical Engineering Role: lecturer, 66 hours |
| 2020/2021 | Course: Automatic Control A, MSc in Mechanical Engineering Role: lecturer, 66 hours |
| 2019/2020 | Course: Automatic Control A, MSc in Mechanical Engineering Role: lecturer, 66 hours |
| 2018/2019 | Course: Intelligent collaborative robotics (SIDRA PhD summer school, C. Melchiorri, M.E. Valcher) Role: lecturer (together with Paolo Rocco), 8 hours |
| | Course: Automatic Control A, MSc in Mechanical Engineering Role: lecturer, 66 hours |
| 2017/2018 | Course: Automatic Control, MSc in Physics Engineering Role: lecturer, 60 hours, and teaching assistant, 40 hours |
| 2016/2017 | Course: Automatic Control, MSc in Physics Engineering Role: lecturer, 60 hours, and teaching assistant, 40 hours |

| | Course: Project Work, MSc in Automation and Control Engineering Role: academic tutor |
|-----------|--|
| | Course: Robot control – State of the art and research trends (PhD course at University of Bergamo) Role: lecturer, 20 hours |
| 2015/2016 | Course: Automatic Control, MSc in Physics Engineering Role: lecturer, 60 hours |
| 2014/2015 | Course: Automatic Control, MSc in Physics Engineering Roles: lecturer, 60 hours, and teaching assistant, 7 hours |
| 2013/2014 | Course: Fondamenti di Automatica (per Aerospaziali), prof. Paolo Rocco Roles: teaching assistant, 28 hours, and lab assistant, 12 hours |
| | Course: Tecnologie dei Sistemi di Controllo per l'Aeronautica, prof. Gianantonio Magnani Role: teaching assistant, 16 hours |
| 2012/2013 | Course: Fondamenti di Automatica (per Aerospaziali), prof. Paolo Rocco Role: teaching assistant, 28 hours |
| | Course: Tecnologie dei Sistemi di Controllo per l'Aeronautica, prof. Gianantonio Magnani Role: teaching assistant, 16 hours |
| 2011/2012 | Course: Fondamenti di Automatica (per Aerospaziali), prof. Paolo Rocco Role: teaching assistant, 28 hours |
| 2010/2011 | Course: Fondamenti di Automatica (per Aerospaziali), prof. Paolo Rocco Role: teaching assistant, 4 hours |
| 2008/2009 | Course: Fondamenti di Automatica (per Aerospaziali), prof. Paolo Rocco Roles: teaching assistant, 26 hours, and lab assistant, 12 hours |

Awards and achievements

Dr. Zanchettin has been recipient of the following awards:

- 1. Best IEEE RAS Chapter Award for year 2019 (together with Prof. Lucia Pallottino);
- 2. Innovation Award MECSPE 2019 (finalist) with Smart Robots, ABB, and Vodafone;
- 3. euRobotics Technology Transfer Award 2018 (third classified) with Smart Robots;
- 4. National qualification for Associate Professor 2017 (Abilitazione Scientifica Nazionale);
- 5. Co-authored IROS 2015 Best Student Paper Award (finalist);
- 6. IEEE I-RAS Young Author Best Paper Award 2014;
- 7. KUKA Innovation Award 2014 (finalist);
- 8. B&R First European Industrial Ethernet Award 2009 (fourth classified);
- 9. Certificate of Merit (Rector of Politecnico di Milano) for the grades during the A.Y. 2003/2004.

Windows, Linux (including real-time kernels) and Mac OS X, Mathworks Matlab & Simulink, Dynasim Dymola, basic knowledge on National Instruments DAQ National Instruments, common programming languages (C, C++, php, Python, SQL, HTML, Modelica, Labview, Matlab) and version control (SVN, Git), IEC 61131-3 (SFC, ST e LD), ABB RAPID, development environments (B&R Automation Studio, Michrochip Technology MPLAB, Rockwell Automation IsaGRAF, Microsoft Visual Studio, Apple Xcode, ABB Robot Studio), 3D modelling (Blender), safety standards for machineries and robots (i.e. ISO 10218, ISO TS 15066).

Prof. Andrea Maria Zanchettin has been also lecturer/instructor in several professional or executive courses on industrial robotics and collaborative robotics:

- Brembo s.p.a. (2017 present),
- Bosch s.p.a. (2018 2019),
- UMANA s.p.a. (2020),
- Experis Academy (2021),
- ITEMA s.p.a. (2021),
- Italpresse s.p.a. (2021),
- Confindustria Bergamo (2019 present),
- Ordine degli Ingegneri di Brescia (2019),
- MIP (2019),
- Università degli Studi di Brescia (2021).

Technology transfer

Startup companies

Smart Robots s.r.l., 25-10-2016 – present Spin-off company of Politecnico di Milano Role: co-founder, member of Board of Directors

Winnica s.r.l. 17-12-2020 – present Start-up company Role: co-founder

Patent Applications

- [P1] <u>A.M. Zanchettin</u> "Method and related system for safely controlling a robot", applicant: Politecnico di Milano, April 2021 (PCT/IB2022/05362).
- [P2] M. Pozzi, D. Prattichizzo, <u>A.M. Zanchettin</u>, P. Rocco "Metodo per generare un segnale di consapevolezza di un robot collaborativo e relativo sistema hardware", applicants: Università di Siena and Politecnico di Milano, August 2018 (IT 102018000007934).
- [P3] <u>A.M. Zanchettin</u>, A. Casalino, L. Piroddi, P. Rocco "A predictive control method of a robot and related control system", applicants: Politecnico di Milano and Smart Robots, June 2018 (PCT/IB2019/054763).
- [P4] <u>A.M. Zanchettin</u>, P. Rocco "*Method and device for controlling the motion of one or more collaborative robots*", applicant: Politecnico di Milano, May 2017 (PCT/IB2017/052932).



WINNIQO

Participation in funded projects

RSAFI, 2022 - present

Funded by: MADE Competence Center 4.0, Ministero dello Sviluppo Economico (Italy) Partners: Alumotion (Italy) Topic: collaborative robotics for sanding and finishing applications **Contribution: co-principal investigator (with Prof. Paolo Rocco and Prof. Matteo Matteucci)**

Consulenza tecnica sul processo di controllo della qualità della produzione di bottiglie, 2022 – present

Funded by: Fondazione Politecnico di Milano, Vetri Speciali (Italy) Topic: robotics for handling and inspecting glass bottles **Contribution: co-principal investigator (with Prof. Paolo Rocco and Prof. Matteo Matteucci)**

Algoritmi di controllo per la preparazione robotizzata di pietanze in dark kitchens, 2021

Funded by: FoodPrime (Italy) Topic: robotized preparation of foods in dark kitchens **Contribution: co-principal investigator (with Prof. Matteo Corno)**

SmartColSoleHand, 2020 - present

Funded by: MADE Competence Center 4.0, Ministero dello Sviluppo Economico (Italy) Partners: Alumotion (Italy), Smart Robots (Italy), Vibram (Italy) Topic: collaborative robotics for manufacturing **Contribution: principal investigator**

Robotica collaborative riconfigurabile, 2020 - present

Funded by: Camozzi (Italy) Topic: intelligent collaborative robotics for flexible assembly operations **Contribution: co-principal investigator (with Prof. Paolo Rocco), project idea**

TIGHT, 2020 – present

Funded by: Ministero dell'Istruzione, Università e Ricerca (Italy), PRIN 2017 Partners: Università di Siena (Italy), Università di Pisa (Italy), CNR (Italy), Università di Roma Tor Vergata (Italy) Topic: intelligent human-robot collaboration for assembly operations **Contribution: local unit coordinator**

VERIFY, 2020

Funded by: EIT Manufacturing Partners: Brembo (Italy), Comau (Greece), University of Patras (Greece) Topic: robotics for machining applications

Tecnologie robotica a supporto della persona in ambito domestico, 2019 – present Funded by: Electrolux (Italy)

Contribution: co-principal investigator (with Prof. Paolo Rocco)

Smart4CPPS, 2018 – 2021

Funded by: Regione Lombardia (Italy) Partners: Università di Bergamo (Italy), Scaglia Indeva (Italy), CNR (Italy), and others Topic: intelligent factory, smart automation, safe human-robot interaction, collaborative robotics, Industry 4.0

Soluzioni di intelligenza artificiale per la diagnostica predittiva di guasti, 2018 – 2019

Funded by: NUM (Italy) Topic: use of machine learning for predictive maintenance, Industry 4.0 **Contribution: co-principal investigator (with Prof. Paolo Rocco)**

RobotHoloProgramming, 2018 Funded by: Regione Lombardia (InnoDriver) Partner: Alascom Services (Italy) Topic: robot programming through mixed reality, Industry 4.0 Contribution: co-principal investigator (with Prof. Paolo Rocco)

Sperimentazione 5G – Robotica collaborativa per Industria 4.0, 2017 – 2020

Promoted by: Ministero dello Sviluppo Economico (Italy) Partners: Smart Robots (Italy), Vodafone (Italy), ABB (Italy) Topic: human-robot collaborative assembly tasks with high-speed low latency connectivity, Industry 4.0 **Contribution: co-principal investigator (with Prof. Paolo Rocco)**

Future Construction Machines, 2016 – 2019

Funded by: Yanmar Research Europe (Italy) Topics: interaction control for hydraulic redundant manipulators, control of agricultural mobile manipulators

ROBOTICS, 2016 – 2017

Funded by: Fondazione Politecnico di Milano, Steriline (Italy) Topic: path planning methods for workspace-sharing industrial robots

INTERACT, 2016 – 2018

Funded by: Fedegari Autoclavi (Italy) Topic: advanced programming tools for industrial robots in sterile environments **Contribution: co-principal investigator (with Prof. Paolo Rocco)**

CREMONA, 2014

Funded by: ABB University Grant (US) Topic: constraint-based robot programming and control **Contribution: project idea, compliant control for dual-arm prototype redundant robot**

Adaptive, 2014 – 2017

Funded by: MIUR (Cluster Tecnologici Nazionali), Università di Bergamo (Italy) Partners: Università di Modena e Reggio Emilia (Italy), Loccioni (Italy), Scaglia Indeva (Italy), and others Topic: intelligent factory, smart automation, safe human-robot interaction, Industry 4.0 **Contribution: ergonomic and safe trajectory generation and handover strategies for collaborative robots**

SCORPION, 2013 – 2014

Sponsored by: KUKA Innovation Award 2014 Technology supplier: KUKA Roboter (Germany) Topic: mobile manipulators, reactive motion planning **Contribution: project idea, implementation of model-predictive control strategy**

ECHORD – Fidelio experiment, 2011 – 2012

Funded by: EU FP7 Partners: Comau (Italy) Topic: machine learning techniques for robotic-aided industrial manufacturing

Quadrivio, 2011 – 2012

Funded by: Regione Lazio (FILAS)
Partners: AeroSekur (Italy)
Topic: navigation and control of an unmanned all-terrain robot
Contribution: implementation of the low-level servo control for automatic steering, braking and throttle control

ROSETTA, 2009 – 2013

Funded by: EU FP7

Partners: Lund University (Sweden), University of Munich (Germany), KU Leuven (Belgium), ABB Corporate Research (Sweden and Germany), Fraunhofer IPA (Germany), and others

Topic: safe human-robot interaction for industrial manipulators

Contribution: development of redundancy resolution strategies for collaborative robotic manipulators and ergonomic assessment, demonstration and validation, scientific dissemination of the corresponding results

Washing Machine Robust Control, 2008 – 2009

Funded by: Fondazione Politecnico di Milano, Indesit Company (Italy) Topic: robust tuning of the velocity loop of a washing machine with low-resolution sensing **Contribution: analysis of source of instability and development of a semi-automatic PID tuning strategy** Dr. Andrea Zanchettin has served as:

- Social Media Chair for IEEE/RSJ IROS 2014 (Chicago, Illinois, USA);
- Publication Co-Chair for I-RIM 3D 2020, online, December 2020;
- Local Arrangement Co-Chair for IEEE ARM 2022 (Chongqing, China), June 2022;
- Scientific organizer of the Workshop on "Assemblaggio 4.0 e robotica collaborativa" (Assembly 4.0 and collaborative robotics), organized by Tecniche Nuove, Milano (Italy), held in Milano in September 2018;
- Scientific organizer of the Workshop on "Automazione 5.0: l'uomo, il robot e l'intelligenza artificiale" (Automation 5.0: the human, the robot, the artificial intelligence), organized by Tecniche Nuove, Milano (Italy), held in Milano in July 2019;
- Scientific organizer of the Workshop "Automazione e robotica Diamo inizio alla fabbrica digitale" (Automation and Robotics Let the Digital Factory begin), organized by Tecniche Nuove, Milano (Italy), held online in July 2020.

Together with Dr. Gianni Borghesan (KU Leuven, Belgium) and Dr. Torsten Kroeger (Google Inc., USA), Andrea Zanchettin co-organized the Workshop entitled "Real-time Motion Generation & Control - Constraint-based Robot Programming" held in Chicago (Illinois, USA) in conjunction with IEEE/RSJ IROS 2014.

Together with Hao Ding, Andrea Zanchettin co-organized the Workshop entitled "Robotic co-workers: methods, challenges and industrial test cases" held in Hamburg (Germany) in conjunction with IEEE/RSJ IROS 2015.

Together with Hao Ding, Dr. Fabrizio Flacco (CNRS – LIRMM), and Mikael Hedelind, Andrea Zanchettin has coorganized the Workshop entitled "Safety-Related Sensing for Collaborative Applications" held in Deajeon (South Korea) in conjunction with IEEE/RSJ IROS 2016.

On May 2020, together with Federica Pascucci (Roma Tre University) and Gianluca Antonelli (Cassino University), Andrea Zanchettin co-organized the online workshop "Arrivano i nostri... ROBOT" on available robotics solution for COVID-19 pandemic mitigation (the workshop is available here: <u>https://www.youtube.com/watch?v=O_yZH1JUAI8</u>).

Editorial activities

Andrea Zanchettin served and serves as a reviewer for many journals on automatic control and robotics, as well as for major international conferences in the same fields.

He has served / is serving as an Associate Editor for the following conferences

- IEEE International Conference on Robotics and Automation (ICRA): 2014 2016,
- IEEE/RSJ International Conference on Intelligent Robot and Systems (IROS): 2014 2016,

as well as an Associate Editor for the following peer-reviewed international journals:

- IEEE Robotics and Automation Letters (RA-L): 2015 2018;
- IEEE Transactions on Robotics (T-RO): 2019 2022;
- IEEE Transactions on Automation Science and Engineering (T-ASE): 2022 present.

as well as Guest Associate Editor for the following special issues:

• "Human-robot collaboration for production environments" (June 2018), IEEE Robotics & Automation Magazine, together with Prof. Elizabeth Croft (formerly with University of British Columbia), Dr. Hao Ding (formerly with ABB Corporate Research) and Prof. Miao Li (Wuhan University), see: <u>http://www.ieee-ras.org/publications/ram/ram-special-issues/special-issue-on-human-robot-collaboration-for-production-environments;</u>

• "Learning Compliant Manipulation with Human in the Loop" (vol 7, issue 3, 2022), IEEE Robotics & Automation Letters, together with Prof. Chenguang Yang (University of Western England), Prof. Miao Li, Hao Ding, and Prof. Julie Shah (MIT) see: <u>https://www.ieee-ras.org/publications/ra-l/special-issues/cfp-learning-and-control-for-robot-compliant-manipulation-with-human-in-the-loop.</u>

and finally member of the Technical Program Committee (TPC) of the following symposia, conferences and workshops:

- 10th International Workshop on Human Friendly Robotics (HFR 2017) held in Naples (Italy) in October 2017;
- DATE 2019 (Design, Automation, and Test in Europe) conference, held in Florence in March 2019;
- IEEE International Conference on Human-Machine Systems (ICHMS 2020), held online in September 2020;
- 14th International Workshop on Human Friendly Robotics (HFR 2021), held online in October 2021.

Since January 2016, Andrea Zanchettin has been member of the Technical and Scientific Board of the national journal Automazione Integrata (published by Tecniche Nuove Group).

IROS In September 2015, Dr. Zanchettin has been appointed as Chair of the IROS iWeb Committee (serving the IROS Steering Committee for the IROS Website Initiative and responsible for <u>iros.org</u> website).

Dr. Zanchettin is member of the IEEE Robotics and Automation Society (RAS) since 2009. He is also member of the IEEE RAS Technical Committees "Algorithms for Planning and Control of Robot Motion" and "Multi-robot systems".

Since 2017, together with Dr. Hao Ding, Prof. Miao Li, and Prof. Julie Shah, Andrea Zanchettin is co-founder and cochair of the IEEE RAS Technical Committee on Collaborative Automation for Flexible Manufacturing (CAFM), https://www.ieee-ras.org/collaborative-automation-for-flexible-manufacturing.



From January 2017 to December 2018, Dr. Zanchettin has been Deputy Chair of the Italian Chapter of the Robotics and Automation Society of IEEE (I-RAS), info at <u>https://r8.ieee.org/italy-ras/</u>. Since January 2019 he is Chair. In 2019, the Chapter has been recognized with the IEEE RAS Best Chapter Award.

Since May 2021, Prof. Zanchettin has been Executive Vice President for Industrial Activities of the Italian Institute of Robotics and Intelligent Machines (I-RIM, <u>https://i-rim.it/en/</u>).

Seminars, workshops and invited talks

At International Conferences

- "Collaborative robotics: the quest for an intelligent co-worker", workshop on "TIGHT Tactile InteGration for Humans and arTificial systems" (organized by M. Pozzi, T. Lisini Baldi, G. Salvietti, M. Malvezzi, D. Prattichizzo, M. Bianchi), ROMAN 2022, to be held in Naples (Italy), 2-9-2022, **invited talk**.
- "Robotics co-workers: a way to include humans and AI in manufacturing operations" workshop on "Human-Robot Interaction: New Trends in Service and Industry" (organized by I. Akli, A. Hentout, S. Bouraine, F. Yacef), ROMAN 2022, to be held in Naples (Italy), 29-8-2022, **invited talk**.
- "From Industrial Automation to Intelligent Collaborative Automation: a way to include humans and AI in assembly operations", 9th CIRP Conference on Assembly Technologies and Systems (CATS), 8-4-2022, Leuven (Belgium), invited keynote talk, https://cats2022.eu/wp-content/uploads/2022/03/programme_CATS2022.pdf.
- "Safety in human-robot collaboration: state of the art and new perspectives", workshop on "Design, Learning, and Control for Safe Human-Robot Collaboration" (organized by M. Selvaggio, G. Notomista, K. Merckaert), ICAR 2021, online, 7-12-2021, **invited talk**.
- "Physiological aspects of human-robot collaboration", workshop on "Ergonomic Human-Robot Collaboration: Applications and Future Research" (organized by L. Peternel, W. Kim, A. Ajoudani, E. Yoshida), IROS 2021, online, 1-10-2021 invited talk.
- "Productivity and ergonomics, a trade-off in human-robot collaboration?", workshop on "From human-robot interaction to collaborative control" (organized by M. Benoussaad, A. Ajoudani, T. Tsuji, M. Rakotondrabe), IROS 2021, online, 27-9-2021, invited talk.
- "A collaborative robotic solution to partly automate SARS-CoV-2 serological tests", IEEE EMBS Grand Challenges Forum: CoViD-19 Healthcare, Screening, Tracing, and Treatment, 13-11-2020, invited keynote talk, https://grand-challenges.embs.org/2020covid/speakers/.
- "Towards an intelligent, collaborative and connected factory", workshop "TIGHT" (organized by M. Pozzi, T. Lisini Baldi, M. Bianchi, D. Prattichizzo), IEEE RO-MAN 2020, 2-9-2020, invited talk.
- Co-author of "An Energy Based Injury Index for Pre-Collision Safety Control in Human-Robot Interaction" (co-

authored with R. Rossi, M. Parigi Polverini and P. Rocco), 8th International Workshop on Human-Friendly Robotics, Munich (Germany), 22-10-2015.

- "Control tools for safe human-robot coexistence", Tutorial on Planning, Control, and Sensing for Safe Human-Robot Interaction (organized by F. Flacco, S. Haddadin, T. Kroeger, D. Lee), IEEE International Conference on Robotics and Automation, 2015, Seattle (WA, USA), 26-5-2015, invited talk.
- "From human motion modelling to constraint-based robot programming", workshop on Redundancy, inequalities and the tools to address them (organized by A. Escande, F. Flacco, N. Mansard, L. Righetti), IEEE International Conference on Humanoids 2014, Madrid (Spain), 18-11-2014, invited talk.
- Co-author of "Towards Safe Human-Robot Interaction: evaluating in real-time the severity of possible collisions in industrial scenarios" (co-authored with M. Ragaglia, L. Bascetta, P. Rocco), 7th International Workshop on Human-Friendly Robotics, Pontedera (Italy), 24-10-2014.
- Co-author of "Task constraints classification and exploitation for safe and productive human-robot interaction" (coauthored with N.M. Ceriani and P. Rocco), 6th International Workshop on Human-Friendly Robotics, Rome (Italy), 25-10-2013.
- Co-author of "A distributed proximity sensor for safe human-robot interaction" (co-authored with G. Buizza Avanzini, P. Rocco, N.M. Ceriani and L. Bascetta), 6th International Workshop on Human-Friendly Robotics, Rome (Italy), 25-10-2013.
- "Human arm motion synthesis: data-driven and biomechanics-based approaches" (co-authored with E. Giovannitti, N.M. Ceriani, and P. Rocco), IEEE ICRA 2013 Workshop on Computational Techniques in Natural Motion Analysis and Reconstruction, Karlsruhe (Germany), 6-5-2013.
- "Human-centric behaviour of redundant manipulators for ergonomic human-robot coexistence" (co-authored with P. Rocco), 5th International Workshop on Human-Friendly Robotics, Royal Military Academy of Brussels (Belgium), 18-10-2012.
- "Sensor-based trajectory generation for safe human-robot cooperation" (co-authored with B. Lacevic), IEEE/RSJ IROS 2012 Workshop on Robot Motion Planning: Online, Reactive, and in Real-time, Vilamoura, Algarve (Portugal), 12-10-2012.

At National Conferences, events, and high-schools

- "Embodied AI", workshop on "Ethics, Safety and human centricity: Intelligent Machines under the scope of the European AI Regulation Act", I-RIM 2021, Rome/online, 9-10-2021, **invited talk**.
- "Robot intelligenti e collaborativi: un'opportunità o una minaccia?", Web Marketing Festival 2021, Rimini (Italy), 17-7-2021, invited talk.
- "Humans and Machines", workshop on "Socio-Physical Interaction Skills for Cooperative Human-Robot Systems in Agile Production", I-RIM 2020, 10-12-2020, invited talk.
- "Humans and robots: from industrial to intelligent automation", workshop "Task and motion planning for effective human-robot collaboration", I-RIM 2020, online, 10-12-2020, **invited talk**.
- Keynote talk "YuMI: il robot collaborativo al servizio dell'analisi dei test sierologici", Web Marketing Festival 2020, 20-11-2020, online.
- "La fabbrica collaborativa digitale" workshop su Automazione e Robotics Diamo inizio alla fabbrica digitale, organized by Tecniche Nuove, Milano (Italy), online, July 2020.
- "Humans and Machines: From Industrial Automation to Intelligent Automation", Fondazione Istituto Italiano di Tecnologia, IIT, 14-02-2020, invited talk.
- "L'esperienza di Vodafone, Smart Robots e ABB", Giornata di studio ANIPLA "Il futuro della comunicazione industriale dal TSN al 5G", Cinisello Balsamo (Italy), 29-10-2019, **invited talk**.
- "Collaborative robots that understand humans (and vice-versa)", workshop "TIGHT", I-RIM 2019, Roma (Italy), 20-10-2019, invited talk.
- "Ottimizzazione di processi produttivi collaborativi mediante intelligenza artificiale", workshop su Automazione 5.0: l'uomo, il robot e l'intelligenza artificiale, organized by Tecniche Nuove, Milano (Italy), 2-7-2019.
- "Quadro introduttivo su Industria 4.0", workshop su Assemblaggio 4.0 e robotica collaborativa, organized by Tecniche Nuove, Milano (Italy), 18-9-2018.
- "Collaborative Robots that understand Humans", Robotics Research Jam, 12-6-2018, Pisa (Italy), invited talk.
- "Predizione e classificazione del comportamento umano con tecniche di Machine Learning per la collaborazione

produttiva uomo-robot", convegno UCIMU Machine Learning e Manutenzione Predittiva: casi industriali ed esperienze di successo, 6-6-2018, Cinisello Balsamo (Italy), **invited talk**.

- "Metodologie reattive di pianificazione del moto che garantiscono il soddisfacimento di specifiche di sicurezza" (co-authored with P. Rocco), ANIPLA/SIRI Workshop on Collaborative Robots, Cinisello Balsamo (Italy), 9-6-2015, invited talk.
- "Optimisation-based design for linear control systems", seminar held at Politecnico di Milano, Dipartimento di Elettronica e Informazione, Milano (Italy), 23-11-2010.

Participation in International Conferences

- 1. International Conference on Advanced Robotics, ICAR 2009, Munich (Germany), June 2009, 22nd-26th.
- 2. IEEE International Conference on Robotics and Automation, ICRA 2010, Anchorage (Alaska, USA), May 2010, 3rd-8th.
- 3. IFAC Symposium on Nonlinear Control Systems, NOLCOS 2010, Bologna (Italy), September 2010, 1st-3rd.
- 4. IEEE International Conference on Robotics and Automation, ICRA 2011, Shanghai (China), May 2011, 9th-13th.
- 5. IFAC World Congress, Milan (Italy), August/September 2011, 28th-2nd.
- 6. IEEE International Conference on Robotics and Automation, ICRA 2012, St. Paul (Minnesota, USA), May 2012, 14th-18th.
- 7. IFAC Symposium on Robot Control, SYROCO 2012, Dubrovnik (Croatia), September 2012, 5th-7th.
- IEEE/RSJ International Conference on Robots and Intelligent Systems, IROS 2012, Vilamoura, Algarve (Portugal), October 2012, 7th-12th.
- 9. IEEE International Conference on Robotics and Automation, ICRA 2013, Karlsruhe (Germany), May 2013, 6th-10th.
- IEEE/RSJ International Conference on Robots and Intelligent Systems, IROS 2013, Tokyo (Japan), November 2013, 3rd-7th.
- 11. IEEE Conference on Decision and Control, CDC 2013, Florence (Italy), December 2013, 10th-13th.
- 12. IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2014, Chicago (Illinois, USA), September 2014, 14th-18th.
- 13. IEEE International Conference on Humanoids, Humanoids 2014, Madrid (Spain), November 2014, 18th-20th.
- 14. IEEE International Conference on Robotics and Automation, 2015, Seattle (WA, USA), May 2015, 26th-30th.
- 15. IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2015, Hamburg (Germany), September/October 2015, 27th-2nd.
- 16. IEEE International Conference on Robotics and Automation, 2016, Stockholm (Sweden), May 2016, 16th-20th.
- 17. IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2016, Daejeon (Korea), October 2016, 9th-14th.
- 18. IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2017, Vancouver (BC, Canada), September 2017, 24th-28th.
- 19. IEEE/RSJ International Conference on Intelligent Robots and Systems, IROS 2018, Madrid (Spain), October 2018, 1st-5th.
- IEEE International Conference on Robot and Human Interactive Communication, RO-MAN 2020, August 31st

 September 4th, 2020, online.
- 21. IEEE International Conference on Human-Machine Systems, ICHMS 2020, September 7th 9th, 2020, online.
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