

MARCO MACCHI

Marco Macchi

Born in Varese (Italy), May, 17th, 1972

Italian citizen

M.Sc. in Ingegneria Gestionale, October, 15th, 1997

Full Professor since March, 11th, 2019

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Marco Macchi is Full Professor at Politecnico di Milano. His teaching activity is in the area of production systems, industrial technologies, asset lifecycle management, operations and maintenance management, both to undergraduate and postgraduate students. He also regularly teaches for the doctorate program in Management Engineering, in the area of modeling and simulation of complex systems.

His research interests are focused on several topics concerning asset and operations management within engineered systems, with a special emphasis to industrial systems engineering. The primary research areas, especially in the most recent years, are:

- Decision-making along the asset lifecycle based on reliability and maintenance engineering;
- Operations and maintenance practices within industrial asset management;
- Intelligent maintenance based on the digitalization of manufacturing assets and the use of advanced techniques for prognostics and health management;
- Intelligent asset management based on digital continuity along the asset lifecycle, with special concern to industrial asset data management, and the integrated use of simulation and monitoring for cost, risk and performance management;
- Maintenance services for asset lifecycle management;
- Maintenance services for sustainable manufacturing;
- Scheduling, shop floor control and execution of manufacturing systems;
- Advanced simulation to support asset and operations management.

I. Current academic positions and roles in scientific communities

- Full Professor at Politecnico di Milano, Department of Management, Economics and Industrial Engineering, since March, 11th, 2019.
- Chair of the IFAC (Int. Federation for Automatic Control) Working Group A-MEST (Advanced Maintenance Engineering, Services and Technology), WG affiliated to the IFAC TC (technical committee) 5.1 Manufacturing Plant Control, since 2014.
- Member of the IFIP WG 5.7 Advances in Production Management Systems, since 2014.
- Vice-chair of the IFAC (Int. Federation for Automatic Control) TC (technical committee) 5.1 Manufacturing Plant Control, since 2012.
- Member of the IFAC (Int. Federation for Automatic Control) TC (technical committee) 5.1 Manufacturing Plant Control, since 2010.
- Book Reviews Editor and Editorial Board Member of the International Journal Production Planning & Control: The Management of Operations, Taylor & Francis, since 2010 (assistant of the former Book Reviews Editor, from 2001 to 2009).

- Invited co-guest editor of four Special Issues published in international scientific journals on the following topics: Advanced Maintenance Engineering, Services, and Technology; Maintenance Modelling and Engineering; Maintenance and Facility Management.

II. Current teaching activities

His teaching activity is in the area of production systems, industrial technologies, asset lifecycle management, operations and maintenance management, both to undergraduate and postgraduate students. His current roles in teaching activities at Politecnico di Milano and at MIP Politecnico di Milano Graduate School of Business are:

- (Postgraduate) Director of the Master programme meGMI (executive in GESTIONE DEGLI ASSET INDUSTRIALI E DELLA MANUTENZIONE - MAINTENANCE AND INDUSTRIAL ASSET MANAGEMENT, formerly titled as GESTIONE DELLA MANUTENZIONE INDUSTRIALE - INDUSTRIAL MAINTENANCE MANAGEMENT);
- (Master of Science) Teacher of the course ASSET LIFECYCLE MANAGEMENT, currently held in the M.Sc. in Management Engineering, M.Sc. in Mechanical Engineering, M.Sc. in Automation and Control Engineering and M.Sc. in Energy Engineering, Politecnico di Milano, Milano, Academic; INDUSTRIAL TECHNOLOGIES, currently held in the M.Sc. in Management Engineering, Politecnico di Milano, Milano;
- (Postgraduate) Teacher of the course GESTIONE STRATEGICA DEL CICLO DI VITA DEGLI ASSET - STRATEGIC MANAGEMENT OF THE ASSET LIFE CYCLE, Master executive in GESTIONE DEGLI ASSET INDUSTRIALI E DELLA MANUTENZIONE - MAINTENANCE AND INDUSTRIAL ASSET MANAGEMENT, formerly titled as GESTIONE DELLA MANUTENZIONE INDUSTRIALE (meGMI) - INDUSTRIAL MAINTENANCE MANAGEMENT;
- (Postgraduate) Teacher of the course INGEGNERIA DI MANUTENZIONE 1 - MAINTENANCE ENGINEERING 1, Master executive in GESTIONE DEGLI ASSET INDUSTRIALI E DELLA MANUTENZIONE - MAINTENANCE AND INDUSTRIAL ASSET MANAGEMENT, formerly titled as GESTIONE DELLA MANUTENZIONE INDUSTRIALE (meGMI) - INDUSTRIAL MAINTENANCE MANAGEMENT.

III. Other roles in scientific and technical communities

- Co-director of the Osservatorio INDUSTRIA 4.0 (formerly named SMART MANUFACTURING) / Observatory INDUSTRY 4.0 (formerly named SMART MANUFACTURING) of the School of Management of Politecnico di Milano, since 2015.
- Scientific responsible of the Osservatorio TECNOLOGIE E SERVIZI PER LA MANUTENZIONE (TeSeM) / Observatory TECHNOLOGIES AND SERVICES FOR MAINTENANCE of the School of Management of Politecnico di Milano, since 2010 (this Osservatorio has been developed to become a network of research units; it is currently composed by 11 Universities in Italy).
- Fellow of the International Society of Engineering Asset Management (ISEAM), since 2016.
- Formerly Secretary, now Chair of the Thesis Award Committee of the EFNMS (European Federation of National Maintenance Societies) Excellence Award for M.Sc. thesis and P.hD thesis in maintenance, since 2015.
- Member of sezione Manutenzione (Maintenance section) ANIMP, Associazione Nazionale di Impiantistica Industriale / National Association of Industrial Plants.
- Director of Manutenzione Tecnica e Management (Maintenance Technique and Management), Thomas Industrial Media, official media of A.I.MAN., the Italian Association of Maintenance, since 2016 (appointed at the direction on 14th July 2016).

IV. Recent research projects

MARCO MACCHI is holding / held the role of scientific responsible, head of research or researcher in the following recent projects (10 selected projects in the time frame 2017-now):

1. BUSINESS PROCESS RE-ENGINEERING PER LA DIGITALIZZAZIONE DELLA GESTIONE OPERATIVA DELLA PRODUZIONE NEL LIGHTHOUSE PLANT DI ANSALDO ENERGIA (English translation: BUSINESS PROCESS RE-ENGINEERING FOR THE DIGITALIZATION OF MANUFACTURING OPERATIONS MANAGEMENT IN THE LIGHTHOUSE PLANT OF ANSALDO ENERGIA), finanziamento nel quadro del LIGHTHOUSE PLANT of ANSALDO ENERGIA, un progetto finanziato dal Ministero dello Sviluppo Economico e dalla regione Liguria / funding within the frame of LIGHTHOUSE PLANT of ANSALDO ENERGIA, a project funded by the Ministry of Economic Development and Liguria region).
2. DIGITALIZZAZIONE DELLA GESTIONE DELLA PRESTAZIONE DEGLI ASSET PRODUTTIVI NEL LIGHTHOUSE PLANT DI ANSALDO ENERGIA (English translation: DIGITALIZATION OF MANUFACTURING ASSETS PERFORMANCE MANAGEMENT IN THE LIGHTHOUSE PLANT OF ANSALDO ENERGIA), finanziamento nel quadro del LIGHTHOUSE PLANT of ANSALDO ENERGIA, un progetto finanziato dal Ministero dello Sviluppo Economico e dalla regione Liguria / funding within the frame of LIGHTHOUSE PLANT of ANSALDO ENERGIA, a project funded by the Ministry of Economic Development and Liguria region).
3. IL TOTAL COST OF OWNERSHIP PER IL SUPPORTO ALLE DECISIONI DI ASSET MANAGEMENT DI UN GESTORE DELL'INFRASTRUTTURA FERROVIARIA: FRAMEWORK DECISIONALE, MODELLO E METODOLOGIA (English translation: TOTAL COST OF OWNERSHIP FOR ASSET MANAGEMENT DECISION SUPPORT OF A RAILWAY INFRASTRUCTURE MANAGER: DECISION FRAMEWORK, MODEL AND METHODOLOGY), finanziamento privato / private funding.
4. INGEGNERIA DI AFFIDABILITA' E DI MANUTENZIONE A SUPPORTO DELLA GESTIONE DEGLI ASSET NEGLI IMPIANTI INDUSTRIALI (English translation: RELIABILITY AND MAINTENACE ENGINEERING TO SUPPORT THE MANAGEMENT OF ASSETS IN INDUSTRIAL PLANTS), finanziamento privato / private funding.
5. MAYA (MULTI-DISCIPLINARY INTEGRATED SIMULATION AND FORECASTING TOOLS, EMPOWERED BY DIGITAL CONTINUITY AND CONTINUOUS REAL-WORLD SYNCHRONIZATION, TOWARDS REDUCED TIME TO PRODUCTION AND OPTIMIZATION), finanziamento nel quadro di H2020 / funding in the H2020 framework.
6. PerFORM WATER 2030 - Platform for Integrated Operation Research and Management of Public Water, finanziamento da / funding by Regione Lombardia.
7. SMART4CPPS - SOLUTIONS FOR CYBER-PHYSICAL PRODUCTION SYSTEMS, finanziamento da / funding by Regione Lombardia.
8. SUSTAIN-OWNER (SUSTAINABLE DESIGN AND MANAGEMENT OF INDUSTRIAL ASSETS THROUGH TOTAL VALUE AND COST OF OWNERSHIP), finanziamento nel quadro di H2020 / funding in the H2020 framework.
9. SVILUPPO DELL'APPROCCIO RELIABILITY & MAINTENANCE ENGINEERING PER LA GESTIONE DELLE PERFORMANCE, DEI COSTI E DEI RISCHI DEGLI ASSET INDUSTRIALI LUNGO IL LORO CICLO DI VITA (English translation: DEVELOPMENT OF THE RELIABILITY & MAINTENANCE ENGINEERING APPROACH FOR THE PERFORMANCE, COST AND RISK MANAGEMENT OF INDUSTRIAL ASSETS ALONG THEIR LIFECYCLE), finanziamento privato / private funding.
10. SVILUPPO DEL SISTEMA DI MANUTENZIONE PREDITTIVA NELLA ROADMAP ANSALDO ENERGIA 4.0 (English translation: DEVELOPMENT OF A PREDICTIVE MAINTENACE SYSTEMS IN THE ROADMAP ANSALDO ENERGIA 4.0), finanziamento privato / private funding.

V. Selected publications in scientific journals

MARCO MACCHI is co-author of the following selected publications (15 publications in the last 10 years, from 2008-now):

1. Irene Roda, Marco Macchi. Factory-level performance evaluation of buffered multi-state production systems. *Journal of Manufacturing Systems*, vol. 50, 226-235, Elsevier Ltd., ISSN: 0278-6125, DOI: 10.1016/j.jmsy.2018.12.008.
2. Luca Fumagalli, Elisa Negri, Edoardo Sottoriva, Adalberto Polenghi, Marco Macchi. A novel scheduling framework: Integrating genetic algorithms and discrete event simulation. *International Journal of Management and Decision Making*, vol. 17, issue 4, 2018, 371-395, Inderscience Publishers, ISSN online: 1741-5187, ISSN print: 1462-4621, DOI: 10.1504/IJMDM.2018.095738.
3. Irene Roda, Marco Macchi. A framework to embed Asset Management in production companies *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, vol. 232, issue 4, August 2018, 368-378, SAGE Publications Ltd, USA, ISSN: 1748-006X, DOI: 10.1177/1748006X17753501.
4. Sayyed Shoaib-ul-Hasan, Marco Macchi, Alessandro Pozzetti, Ruth Carrasco-Gallego. A routine-based framework implementing workload control to address recurring disturbances. *Production Planning & Control: The Management of Operations*, vol. 29, issue 11, 2018, 943-957, Taylor & Francis, UK, ISSN: 0953-7287.
5. Alessia Napoleone, Alessandro Pozzetti, Marco Macchi. A framework to manage reconfigurability in manufacturing. *International Journal of Production Research*, vol. 56, issue 11, 3815-3837, 2018, Taylor & Francis, UK, ISSN: 1366588X, 00207543, DOI: 10.1080/00207543.2018.1437286.
6. Francisco J. Tapia-Ubeda, Pablo A. Miranda, Marco Macchi. A Generalized Benders Decomposition based algorithm for an inventory location problem with stochastic inventory capacity constraints. *European Journal of Operational Research*, vol. 267, issue 3, 806-817, 2018, Elsevier B.V., The Netherlands, ISSN: 0377-2217, DOI: 10.1016/j.ejor.2017.12.017.
7. Antonio J. Guillén, Adolfo Crespo, Marco Macchi, Juan Gómez. On the role of Prognostics and Health Management in advanced maintenance systems. *Production Planning & Control: The Management of Operations*, vol. 27, no. 12, 991-1004, 2016, Taylor & Francis, UK, ISSN: 0953-7287, (online) DOI:10.1080/09537287.2016.1171920.
8. Cristian Colace, Luca Fumagalli, Simone Pala, Marco Macchi, Nelson R. Matarazzo, Maurizio Rondi. Implementation of a condition monitoring system on an electric arc furnace through a risk-based methodology. *Proceedings of the Institution of Mechanical Engineers, Part O: Journal of Risk and Reliability*, Volume 229, Issue 4, August 2015, 327-342, SAGE Publications Ltd, USA, ISSN: 1748-006X, DOI: 10.1177/1748006X15576441.
9. Irene Roda, Marco Macchi, Luca Fumagalli, Pablo Viveros. A review of multi-criteria classification of spare parts - From literature analysis to industrial evidences. *Journal of Manufacturing Technology Management*, Volume 25, Issue 4, April 2014, 528-549, Emerald Group Publishing Ltd, UK, ISSN: 1741-038X, DOI: 10.1108/JMTM-04-2013-0038.
10. Marco Macchi, Adolfo Crespo Márquez, Maria Holgado, Luca Fumagalli, Luis Barberá Martínez. Value-driven engineering of E-maintenance platforms. *Journal of Manufacturing Technology Management*, Volume 25, Issue 4, April 2014, 568-598, Emerald Group Publishing Ltd, UK, ISSN: 1741-038X, DOI: 10.1108/JMTM-04-2013-0039.
11. Marco Tantardini, Alberto Portioli Staudacher, Marco Macchi. A model for considering the impact of rescheduling planned maintenance activities in a maintenance service contract. *Production Planning & Control: The Management of Operations*, Volume 25, Issue 3, January-March 2014, 241-259, Taylor & Francis, UK, ISSN: 0953-7287, DOI:10.1080/09537287.2012.665094.

12. Marco Macchi, Luca Fumagalli. A maintenance maturity assessment method for the manufacturing industry. *Journal of Quality in Maintenance Engineering*, Volume 19, Issue 3, August 2013, 295-315, Emerald Group Publishing Ltd, UK, ISSN: 1355-2511, DOI: 10.1108/JQME-05-2013-0027.
13. Marco Macchi, Marco Garetti, Domenico Centrone, Luca Fumagalli, Gian Piero Pavirani. Maintenance management of railway infrastructures based on reliability analysis. *Reliability Engineering & System Safety*, Volume 104, August 2012, 71-83, Elsevier Ltd, UK, ISSN: 0951-8320, DOI: <http://dx.doi.org/10.1016/j.ress.2012.03.017>.
14. Marco Macchi, Fredy Kristjanpoller, Marco Garetti, Adolfo Arata, Luca Fumagalli. Introducing buffer inventories in the RBD analysis of process production systems. *Reliability Engineering & System Safety*, Volume 104, August 2012, 84-95, Elsevier Ltd, UK, ISSN: 0951-8320, DOI: 10.1016/j.ress.2012.03.015.
15. Sergio Cavalieri, Marco Garetti, Marco Macchi, Roberto Pinto. A decision making framework for managing maintenance spare parts. *Production Planning & Control: The Management of Operations*, Volume 19, Issue 4, June 2008, 379-396, Taylor & Francis, UK, ISSN: 0953-7287, DOI: 10.1080/09537280802034471.

VI. Roles in the organization of international scientific events

Marco Macchi was / is involved in the organization of international scientific event. The following list includes the roles held by Marco Macchi within the context of international scientific events.

- Honorary Chair of the PHM (Prognostics & Health Management) Asia Pacific 2019, Beijing, China, 22-24 July 2019.
- Vice-chair of the of the International Program Committee of the 13th IFAC Workshop on Intelligent Manufacturing Systems (IFAC IMS 2019), Oshawa, Ontario, Canada, 12-14 August 2019.
- Chair of the 16th IFAC Symposium on Information Control Problems in Manufacturing (IFAC INCOM 2018), Bergamo, Italy, 11-13 June 2018 (co-chair with Sergio Cavalieri).
- Chair of the Doctoral workshop of the IFIP Working Group 5.7 on Advances in Production Management Systems in the context of the International Conference on Advances in Production Management Systems (APMS 2017), Hamburg, Germany, 3-7 September 2017 (co-chair with Ralph Riedel, Netland Torbjorn).
- Technical Associate Editor of the International Program Committee of the 20th World Congress of the International Federation of Automatic Control (IFAC 2017 World Congress), Toulouse, France, 9-14 July 2017.
- Chair of the International Program Committee of the 3rd IFAC workshop on Advanced Maintenance Engineering, Services and Technology (IFAC A-MEST 2016), Biarritz, France, 19-21 October 2016 (co-chair with Christos Emmanoulidis).
- Chair of the Doctoral workshop of the IFIP Working Group 5.7 on Advances in Production Management Systems in the context of the International Conference on Advances in Production Management Systems (APMS 2015), Tokyo, Japan, 5-9 September 2015 (co-chair with Hironori Hibino).
- Technical Associate Editor of the International Program Committee of the 15th IFAC Symposium on Information Control Problems in Manufacturing (IFAC INCOM 2015), Ottawa, Canada, 11-13 May 2015.
- Technical Associate Editor of the International Program Committee of the 19th World Congress of the International Federation of Automatic Control (IFAC 2014 World Congress), Cape Town, South Africa, 24-29 August 2014.
- Chair of the International Program Committee of the 2nd IFAC workshop on Advanced Maintenance Engineering, Services and Technology (IFAC A-MEST 2012), Seville, Spain, 21-23 November 2012 (co-chair with Benoit lung).

- Chair of the International Program Committee of the 1st IFAC workshop on Advanced Maintenance Engineering, Services and Technology (IFAC A-MEST 2010), Lisboa, Portugal, 1-2 July 2010 (co-chair with Benoit lung).
- Chair of the International Conference on Modern Information Technology in the Innovation Processes of Industrial Enterprises (MITIP 2009), Bergamo, Italy, 15-16 October 2009 (co-chair with Roberto Pinto).

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