

## PROF. CATERINA RIZZI

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### 1. SUMMARY

#### 1.1 EDUCATION AND CURRENT POSITION

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Caterina Rizzi was awarded a master degree in Physics at Università di Milano in 1985 and, currently, is Full professor (since 2001) and Head of the Department of Management, Information and Production Engineering, Università di Bergamo.

#### 1.2 ACADEMIC POSITIONS

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2001-           Università di Bergamo, Full Professor, Engineering Campus.  
 1995-2001    Università of Parma, Associate professor, Faculty of Engineering.  
 1992-1995    Università di Napoli Federico II, Associate professor, Faculty of Engineering.

#### 1.3 PREVIOUS POSITIONS

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20 Dec 1989- 30 Oct 1992 **Researcher** at the coordination board of the targeted project on robotics of CNR (National Research Council).  
 Dec 1987 – Nov 1988 Italcad Tecnologie e Sistemi's **scholarship** at CNR (National Research Council) – IMU (Institute for industrial automation).  
 15 Nov 1986 – 14 Nov 1987 Italcad- Selenia Autotrol's **scholarship** at Politecnico di Milano, Department of Mechanical Engineering.  
 15 Nov 1985-14 Nov 1986 **Fellow** at Politecnico di Milano, Department of Mechanical Engineering.

#### 1.4 RESEARCH AREAS

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At present, she coordinates the **V&K-Virtualisation & Knowledge** ([www.unibg.it/vk](http://www.unibg.it/vk)) research Group composed by 7 **people** (2 associate professors, 1 assistant professor, 2 PhD students and 2 research assistants). Research activities are carried out within the framework of European, national (e.g., 6th and 7FP EU programmes, Industria 2015) and projects and research contracts with private institutions and industrial companies.

**Scientific competences** concern methodologies and ICT tools to support the product development process: from CAx to PDM systems and to systems for knowledge management and systematic innovation (e.g., TRIZ) in different industrial contexts.

In particular, **since 1985**, she carried out research activities in the following **research areas**: Solid and surface modelling, Graphical user interface and related development tools, 3D CAD systems for automotive industry, Virtual prototyping and Virtual/Augmented Reality, Knowledge Based Systems, Physics-based modelling and simulation of non-rigid products; Virtual Ergonomics and Digital human modelling, Additive manufacturing, Eco-design, Systematic innovation; Intellectual Property Management; PDM/PLM systems to manage the product life-cycle applied in different industrial sectors, from Mechanics and Automotive to Textile-Clothing and Healthcare.

#### 1.5 AWARDS & HONORS

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##### Best Paper Award:

- Comotti C., Regazzoni D., Rizzi C., Vitali A. (2016). Optimization Method for Additive Manufacturing: an Application in the Medical Field. In Proceedings of International Conference on

Innovative Design and Manufacturing, ICIDM 2016, January 24-26, 2016, Auckland, New Zealand, USA.

- Carulli M., Vitali A., Caruso G., Bordegoni M., **Rizzi C.**, Cugini U. (2017). ICT technology for innovating the garment design process in fashion industry. In Proceedings of ICORD 2017, January 9-11, 2017, Guwahati, India.

**KM Award:** Best presentation at the 19th Workshop on “Infrastructure and application to manage and disseminate organizational knowledge”, Milan, Italy, 16 October 2014.

**Innovact Prize:** The project "Virtual Socket Design - VK Group, University of Bergamo" won the 3rd Prize (among 120 participants) at the Innovact - The European Forum for Innovative Start-Ups, Chambre de Commerce et d'Industrie de Reims et d'Épernay, March 2013.

## 2. PUBLICATIONS

### 2.1 SCIENTIFIC PUBLICATIONS

Caterina Rizzi has published more than 200 scientific publications; in particular, more than 35 articles in ISI/Scopus scientific journals and more than 45 in proceedings of Scopus-indexed conferences (including ASME and ACM conferences) on the major research subjects. She has co-edited a book published by Springer, published 3 chapters in Springer books, and one published in the ASME ACIER Series. See also ResearchGate repository.

#### Relevant journal publications

1. Colombo G., **Rizzi C.**, Regazzoni D., Vitali A. (2018). 3D interactive environment for the design of medical devices. *International Journal on Interactive Design and Manufacturing*, p. 1-17.
2. Colombo G., **Rizzi C.**, Regazzoni D., Vitali A. (2018). Extending VTK library to dynamically modify polygonal meshes in medical applications. *Computer-Aided Design and Applications*, vol. 15, p. 203-210.
3. Comotti C., Regazzoni D., **Rizzi C.**, Vitali A. (2017) Additive manufacturing to advance functional design: an application in the medical field. **Journal of Computing and Information Science In Engineering**, vol. 17, p. 1-9.
4. Spreafico C., Russo D., **Rizzi C.** (2017). A state-of-the-art review of FMEA/FMECA including patents. *Computer Science Review*, vol. 25, p. 19-28.
5. Colombo G., Facoetti G., **Rizzi C.**, Vitali A. (2016). Mixed reality to design lower limb prosthesis. *Computer-Aided Design and Applications*, vol. 13, p. 799-807.
6. Regazzoni D., Rizzi C. (2016). Patients' evaluation based on digital motion acquisition. *Computer-Aided Design and Applications*, vol. 13, p. 808-815.
7. Colombo G., Facoetti G., **Rizzi C.**, Vitali A. (2015) Simplynurbs: a software library to model NURBS for medical applications. *Computer-Aided Design And Applications*, vol. 12, p. 794-802.
8. Serafini, M., Russo, D., **Rizzi, C.** (2015) Multi Criteria Material Selection for Eco-design, *Computer-Aided Design and Applications*, 12 (5), pp. 526-536.
9. Regazzoni, D., **Rizzi, C.**, (2015) Depth sensors along the design and validation of lower limb prosthesis, *Journal of Integrated Design and Process Science*, 19 (1), pp. 71-80.
10. Regazzoni D., De Vecchi G., **Rizzi C.** (2014) RGB cams vs RGB-D sensors: low cost motion capture technologies performances and limitations. *Journal Of Manufacturing Systems*, vol. 33, p. 719-728.
11. Russo, D., **Rizzi, C.** (2014) Structural optimization strategies to design green products, *Computers in Industry*, 65 (3), pp. 470-479.
12. Russo, D., **Rizzi, C.**, Montelisciani, G. (2014) Inventive guidelines for a TRIZ-based eco-design matrix, *Journal of Cleaner Production*, 76, pp. 95-105.
13. Colombo, G., Facoetti, G., **Rizzi, C.** (2013) A digital patient for computer-aided prosthesis design, *Interface Focus*, 3 (2).
14. Regazzoni, D., **Rizzi, C.** (2013) Digital Human Models and Virtual Ergonomics to Improve Maintainability, *Computer-Aided Design and Applications*, 11 (1), pp. 10-19.
15. Buzzi, M., Colombo, G., Facoetti, G., Gabbiadini, S., **Rizzi, C.** (2012). 3D modelling and knowledge: tools to automate prosthesis development process. *International Journal On Interactive Design And Manufacturing*, 6, p. 41-53.
16. Regazzoni, D., **Rizzi C.**, Nani R. (2011) A TRIZ-based approach to manage innovation and intellectual property. *International Journal of Technology Management*, 55, pp. 274-285.
17. Colombo, G, Filippi S, **Rizzi C.**, Rotini F. (2010) A new design paradigm for the development of custom-fit soft sockets for lower limb prostheses, *Computer in Industry*, 61(6), pp. 513-523.
18. M. Bertoni, M. Bordegoni, U. Cugini, D. Regazzoni, and C. **Rizzi**, (2009) PLM paradigm: How to lead BPR within the Product Development field, *Computers in Industry* 60, pp. 476-484.
19. G. Colombo, D. Pugliese, and C. **Rizzi**, (2008), Developing DA Applications in SMEs Industrial Context, *Computer Aided Innovation (CAI), WCC 2008*, Ed. G. Cascini, Spriger, pp.69-82.

20. A. Carubelli, M. Fontana, C. Rizzi, U. Cugini, (2005) ClothAssembler: a CAD Module for Feature-based Garment Pattern Assembly, *Computer Aided Design and Applications*, 2(6), pp. 795-804.
21. Fontana, M., Rizzi, C., Cugini, U., (2005) 3D Virtual Apparel Design for Industrial Applications, *Computer Aided Design*, Ed. Elsevier, 37, pp. 609-622.
22. Susca L., Mandorli F., Rizzi C., U. Cugini, Racing Car Design using Knowledge-Aided Engineering, in *AIEDAM*, 14(3), June 2000, pp. 235-249.

### 3. RESEARCH PROJECTS

#### 3.1 PARTICIPATION AND COORDINATION OF NATIONAL PROJECTS

She participated and coordinated research activities within the frame of the following National projects funded by CNR, Italian Ministry of Education and Research (MIUR), Lombardy Region and Fondazione Cariplo:

- BODY-SCAN Project (Industria 2015 programme) funded by the Ministry of Economic Development from 15 April 2014 as Coordinator of University of Bergamo Research Unit.
- Project I4BIO3 (Innovation for Bioengineering) funded by Fondazione CARIPLO from March 2012 to February 2013 as Coordinator.
- Project "Development of methods and Techniques for Intellectual Property Management to enhance the competitiveness of SMEs in Bergamo District" funded by Bergamo Chamber of Commerce and Lombardy Region from July 2009 to June 2011 as Coordinator.
- Projects I4BIO-I4BIO2 (Innovation for Bioengineering) funded by Fondazione CARIPLO from September 2009 to April 2011 as Coordinator. Eleven young researchers participated to the projects in the field Tissue Engineering, 3D Imaging, Lower limb prosthesis and Intellectual Property Management.
- Coordinator of National Leonardo Project4 IN-OLTRE4 (LLP-LdV-PLM-10-IT-153), from June 2010 to May 2012 in collaboration with Politecnico di Milano, University of Padua and Florence and 5 companies from 4 European countries to promote young graduate mobility in an European context on advanced methodologies and IT tools for product development processes.
- MIUR-PRIN2005 DESPRO (DESIGN PROsthesis) – "Integration of Innovative Methodologies to design and Develop Custom-fit Products: Application and validation for a Socket of a Lower Limb Prosthesis" from 31 January 2006 to 30 January 2008 - National Coordinator.
- Project ID 307627 "TRIZ and Systematic Innovation for SMEs" funded by Lombardy Region and coordinated by Politecnico Innovazione, Milan, from March 2006 to October 2006.
- MIUR-PRIN2002 VI-CLOTH (VIRtual CLOTHing) ([www.kaermart.it/vi-cloth](http://www.kaermart.it/vi-cloth)) from 15 November 2003 to 14 November 2005 – National Coordinator.
- COORDINATOR of National Leonardo Projects IN-OLTRE (N. I/047°/PL/154393-SU), IN-OLTRE2 (N. I/06/A/PL/154425-SU) and IN-OLTRE3 (N. LLP-LdV-PLM-08-IT-249) from October 2004 to May 2008 in collaboration with Polytechnic of Milan, University of Padua and 6 companies from 5 European countries to promote students mobility in an European context through stages at European companies on advanced methodologies and IT tools for product development processes.
- TA2000 - PNR Tessile/Abbigliamento, National Research Programme on Textile and Clothing funded by Italian Research Ministry for the development of 3D interactive environment to design base garment from September 1997 to February 2001 – Researcher and Local Technical Responsible, Department of Industrial Engineering, University of Parma.
- Project of the National Research programme in Antarctica "Development of a tele-operated robotic system to acquire environmental data: design and simulation" from 1995 to 1998 - Researcher, Department of Industrial Engineering, University of Parma.
- National Research Project – ex- 40% "Methods knowledge-based for product design" from 1993 to 1996 – RESEARCHER, University Federico II of Naples and University of Parma.
- National Project P.F. RAISA: "Computer Science and Robotics for dairy farm: design and development of a milking robot from February 1991 to January 1994 – Researcher, Computer Science and Biomathematics Institute, University of Parma (Resp. Prof. F. Grasselli).

### 3.2 PARTICIPATION AND COORDINATION OF INTERNATIONAL PROJECTS

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Research activities have been carried out within the frame of the following UE projects:

- FP6 IP "CUSTOM-FIT" from September 2004 to March 2009 as External Collaborator of Polytechnic of Milan, partner of the project.
- Leonardo Pilot Project "PANEUROPEAN I-TECH CHALLENGE" from March 2002 to December 2003.
- BRITE/EURAM project n. BE 4259 DMU-FS - "Digital Mock-Up – Functional Simulation" from June 1997 to May 2011 - Researcher and Technical Responsible, Department of Industrial Engineering, University of Parma.
- BRITE/EURAM project n. BE96-3542 "MASCOT - 3D-Garment Design and Simulation" from March 1997 to 31 May 2001 - Researcher and Technical Responsible, Department of Industrial Engineering, University of Parma.
- Concerted Action FAIR CT-97-1998 MACA – "Meat Automation Concerted Action" – Representative of the University of Parma. She has been also the Coordinator of the working group "Grasping and Manipulation" and MEMBER of the Steering Committee.
- ESPRIT III project n. 6061 INTERACTORS (High level multimedia user interface INTERACTORS for real-time industrial applications) from May 1992 to April 1995 - Researcher, Department of Industrial Engineering, University of Parma.
- BRITE/EURAM II project n. BE 4259 NORMAH "Research on Automatic Handling techniques for non-rigid materials based on their property" from September 1991 to August 1994, Researcher, Department of Industrial Engineering, University of Parma.
- ESPRIT II project n.5391 - HYPERFACE (A HYPERmedial user interFACE management system for industrial applications) from October 1990 to November 1992 - Researcher and Technical Responsible, IMU-CNR.
- ESPRIT I Project n.1556 – VITAMIN (VIsualization sTANDARD tools for Manufacturing INDustry), from December 1986 to December 1989 - Researcher Department of Mechanics, Polytechnic of Milan.

## 4. TEACHING

### 4.1 COURSES TAUGHT

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- 2017- **Human Modeling**, M.Sc, School of Medicine and Surgery, Università di Milano Bicocca and Università di Bergamo.
- 2002- **Technical drawing**, B.Sc., Faculty of Engineering (Mechanical Engineering), Università di Bergamo
- 2004 – **Methods and Tools for Product Life Cycle management**, Faculty of Engineering (Mechanical Eng., Management Eng. and Information Eng.), Università di Bergamo
- 2004- 2011 **Virtual Prototyping**, M.Sc., Faculty Engineering (Mechanical Engineering, Computer Engineering), Università di Bergamo
- 2002- 2006 **Virtual prototyping of products and Processes**, M.Sc., Faculty of Engineering (Mechanical Engineering), Università di Bergamo
- 2003-2005 **Image processing for Design**, M.Sc., Faculty of Architecture (Industrial Design), Università di Parma
- 1995-2001 **Computer Aided Design**, B.Sc. and M.Sc., Faculty of Engineering (Mechanical Engineering), Università di Parma
- 1992-1995 **Technical drawings**, B.Sc., Faculty of Engineering (Chemical Engineering), Università di Napoli Federico II.

### 4.2 LABORATORIES

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- 2003- **Coordinator** of the PLM/V&K Laboratory, Department of Management, Information and Production Engineering.

## 5. SERVICES

### 5.1 NATIONAL/INTERNATIONAL SERVICE (2009 – TODAY)

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#### Member of PhD boards

- **Coordinator (a.y. 2017-2018) and Member** of the academic board of the PhD programme in Technology, Innovation and Management (TIM) jointly founded University of Bergamo and University of Naples Federico II (2017-).
- **Member** of the academic board of the PhD programme in Economics and Management of Technology (DREAMT) jointly founded by University of Pavia and University of Bergamo (2013-2017).
- **Member** of Board of Supervisors, PhD programme Doctoral School in Industrial Engineering - Chemical, Materials and Manufacturing Engineering coordinated by University of Padua (2006-2012).
- Member of various **national and international Boards of Examiner** of PhD students.

#### Member of steering and technical Committees

- Nominated **Chairperson of the ASME-CIE CAPPD** (Computer Aided Product and Process Development) Technical Committee, 2014-2015.
- Nominated **Chairperson of Scientific Board of the ADM Association** (national association of Design and Methods for Industrial Engineering) from February 2, 2018.
- **Member at large** of the Executive Committee of the ASME CIE Conference since 2018.
- Nominated **Member of the Scientific technical committee, FROM Foundation** ([http://www.asst-pg23.it/section/2109/FROM\\_Fondazione\\_per\\_la\\_ricerca\\_ospedale\\_di\\_Bergamo](http://www.asst-pg23.it/section/2109/FROM_Fondazione_per_la_ricerca_ospedale_di_Bergamo)), Papa Giovanni XXIII, Hospital, Bergamo from February 2019.
- **Member** of Lombardy Regional Board on Welfare and Health from June 2019.

#### Member of the Editorial Board of:

- CAD&A Journal, Francis & Taylor.
- Journal of Computational Design and Engineering (JCDE), Elsevier.
- Frontiers in Mechanical Engineering.

#### Associate Editor of:

- Journal of Computing and Information Science in Engineering, ASME.

#### Member of research/educational project evaluation boards

- Appointed by the European Commission as evaluator of project proposals in FP7-PEOPLE-2009, FP7-PEOPLE-2010, FP7-PEOPLE-2011, FP7-PEOPLE-2012, FP7-PEOPLE-2013 Marie Curie Actions Calls.
- Appointed by the Regione Piemonte (Italy) as evaluator of industrial research proposals (2009).
- Appointed by Ministry of Education, Youth and Sports – EU Operational Programme Management Section, Czech Republic as evaluator project proposals (2010)
- Appointed by European Commission as an independent expert for monitoring FP7-ICT SMART VORTEX project (2011-2014).
- Appointed by the European Commission as evaluator of project proposals in Horizon 2020 MSCA Calls.

### 5.2 DEPARTMENT/UNIVERSITY SERVICE (CURRENT)

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- Sept 2014-** Head of the Department of Management, Information and Production, University of Bergamo
- Oct 2015-** Elected Member of the Academic Senate of the University of Bergamo.
- Sept 2016-** Member of the Technology Transfer Board at University of Bergamo.
- Feb 2017-** Member of the Management Board of the International Medical School, University of Bergamo, Università di Milano Bicocca and University of Surrey, UK.
- Feb 2015-** Member of the Management Board of the School of Engineering, University of Bergamo.

### 5.3 CONFERENCE ORGANIZATIONS AND PARTICIPATION TO PROGRAM COMMITTEES ( 2010 – TODAY)

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- **Conference Chair and/or Organizer of:**
  - TRIZ Future Conference 2010, Bergamo, 3-5 November 2010.
  - International CAD Conference and Exhibition 2013, Bergamo, 17-20 June 2013.
  - International Conference on Innovative Design and Manufacturing (ICIDM), July 17-19, 2017, Milan, Italy.
  - ADM2019 International Conference, Modena, Italy, September 9-10, 2019.
- **Program Chair** of the 12th ACM SIGGRAPH Virtual Reality Continuum and Its Applications in Industry, Hong Kong, November 17-19, 2013.
- **Program Chair** of the 2014 International Conference on Innovative Design and Manufacturing (ICIDM), Montreal, 13-15 August 2014.
- **Co-Organizer** of the CIE Engineering Applications of Brain Science & Human Models Symposium at **ASME/IDETC CIE 2012**, Chicago, 12-15 August 2012.
- **Organizer or Co-Organiser** of the Sessions:
  - CIE CAPPD: Digital Human Modeling for Engineering Application Symposium at **ASME/IDETC CIE 2013**, Portland, 4-7 August 2013.
  - CIE CAPPD/ AMS: Human Modeling: Methods and Applications in Engineering Symposium at **ASME/IDETC CIE 2015**, Boston, 2-5 August 2015 and at **ASME/IDETC CIE 2016**, Charlotte, 22-24 August 2016.
  - CIE CAPPD General Symposium at **ASME/IDETC CIE 2015**, Boston, 2-5 August 2015, **ASME/IDETC CIE 2016**, Charlotte, 22-24 August 2016, **ASME/IDETC CIE 2017**, Cleveland, August 2017 and **ASME/IDETC CIE 2018**, Quebec City, Canada, August 2018.
  - CIE CAPPD: Human Modeling: Methods and Applications in Engineering Symposium at **ASME/IDETC CIE 2017**, Cleveland, August 2017, **ASME/IDETC CIE 2018**, Quebec City, Canada, August 2018, and **ASME/IDETC CIE 2019**, Anaheim, USA, August 2019.
- **Co-organiser of Track:** Systems, Design and Complexity at **ASME IMECE 2017**, Tampa Bay-USA, November 2017 and **ASME IMECE 2019** Salt Lake City -USA, November 2019.
- **Member of International Program Committee of**
  - ISC - Industrial Simulation Conferences – Track: Simulation in Industrial Design and product design, since 2008.
  - TMCE 2010, April 2010, Ancona, Italy.
  - ICoRD '19, 9-11 January 2019, Bangalore, India.
  - SDM 2019, 6th International Conference on Sustainable Design and Manufacturing, 4-5 July 2019, Budapest, Hungary.
- **Member of International Organizing Committee – Europe**, CAD & Exhibition Conference, **since 2014**.
- **Member of the Program Board** of the International Conferences on Digital Human Modeling and Applications in Health, Safety, Ergonomics and Risk Management, HCI International, **since 2015**.
- **Member of the International Scientific Committee of:**
  - ICED 2015, Milan, 27-30 July, 2015.
  - MTD (Meaningful Design Technology, Guimaraes (Portugal) 20-21 July, 2017
- **Member of Advisory Board of:**
  - 8th IPSS CONFERENCE Product-Service Systems across Life Cycle, 20-21 June 2016, Bergamo (Italy)
  - 7th International Conference on Design Computing and Cognition (DCC'16) 27-29 June 2016, Northwestern University, Evanston (Chicago), USA.
  - 8th International Conference on Design Computing and Cognition (DCC'18) 2-4 July 2018, Polytechnic di Milano, Lecco, Italy.
  - 9th International Conference on Design Computing and Cognition (DCC'20) 29 June – 1 July 2020, Georgia Institute of Technology, Atlanta, USA.
- **Keynote speaker at:**
  - ICE Conference 2014, Bergamo, June 23-25 2014;

- CAD 15 Conference, London, 22-25 June, 2015.
- 29<sup>th</sup> James H. Belfer Memorial Symposium – Design and Manufacturing in the Industry 4.0 Era, 29 May 2018, Technion – Israel Institute of Technology, Haifa, Israel. Keynote lecture “The virtual human in the digital industry”.
- **Invited Talk at:**
  - HCI 2015, Los Angeles, 2-7 August, 2015 “Ergonomic Assessments using Advanced Virtual Prototyping Technique” in the 6th International Conference on Digital Human Modeling and applications in Health, Safety, Ergonomics and Risk Management, Los Angeles;
  - ADCP 2015 Workshop, Hangzhou (China), 18-20 September 2015-10-08;
  - Plenary talk 2014 International Conference on Innovative Design and Manufacturing, Montreal, Canada, August 13-15, 2014;
  - ASME IDETC/CIE 2014, Buffalo (USA) 17-20 August 2014, VES Panel, Low cost Motion Capture Systems for industrial and medical applications.

#### 5.4 REVIEW SERVICE ( 2010 – TODAY )

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- **Reviewer of articles for scientific journals:** CAD, Computer Aided Design & Applications, Applied Ontology, Co-Design, JRRD (Journal of Rehabilitation Research and Development), IEEE-Transactions on Biomedical Engineering, IEEE Transactions on Automation Science and Engineering, International Journal of Product Development, European Journal of Social Sciences, International Journal of Management and Decision Making, IJCAT, Journal of Intelligent Manufacturing, IJIDeM, Journal of Manufacturing Systems, CIRP Journal of Manufacturing Science and Technology and Computers in Industry.
- papers reviews for TRIZ Future Conference, since 2006
- papers review for ASME-IDETC, since 2008
- papers review for ASME/IMECE, 2010, 2015- 2019
- papers review for Virtual Concept, 2010
- papers review for CAD&A, 2010, 2011, 2015- 2019
- papers review for ICED, 2013, 2015, 2018, 2019
- papers review for HCI International, 2014- 2017
- papers review for VRCAI, 2015
- papers review for TMCE, 2016
- papers review for ICDIM, 2016, 2017

#### 5.5 OTHERS

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- Member, ASME: MEMBERSHIP #: 100135965
- Founder and co-owner of BiGFLO spin-off (<http://www.bigflo.it>) whose aim is to develop software solutions to support companies during product and process innovation (2012-today).