

Federico Cheli was born in Parma on 29/9/1956, he graduated in Mechanical Engineering in 1981 at the Politecnico di Milano. In 1983 he was appointed as university researcher at the Department of Mechanics of the Politecnico di Milano within the SSD of Mechanics Applied to Machines ING-IND / 13. In 1992 he became associate professor and next in 2000 full professor at the Faculty of Industrial Engineering at the Politecnico di Milano.

In 2016/2018 he was qualified as commissioner for the national scientific qualification sector 09 / A2 Applied Mechanics to Machines.

Scientific activity is mainly carried out in the field of dynamics, vibrations and stability of mechanical systems. More specifically, the research activity concerned:

- theoretical-experimental studies on the dynamics of rail, tram and underground vehicles;
- theoretical and experimental studies on the dynamics of road vehicle in relation to performance, handling and comfort problems;
- modeling and testing of the tire and its interaction with the vehicle;
- studies on the aerodynamics of rail and road vehicles;
- identification of the parameters of mechanical systems and their control;
- studies, design and prototypes of hybrid / electric vehicles;
- active control applications applied to the vehicle (active suspensions, active differentials), to heavy vehicles (roll-over), to rail vehicles;
- studies on ADAS system active control;
- numerical and experimental studies on connected (5G) and autonomous vehicles (Berkeley, TU Delft, Tsinghua University collaborations).

The scientific activity has given rise to 472 scientific publications (as confirmed by the personal website of CINECA), 114 of which published in national and international specialized journals and more than 300 presented at national and international conferences.

Metrics overview from Scopus.com (date 8th-1-2021) are: 222 document, 2758 Citations by 1988 documents, 28 *h*-index

Scientific acknowledgments

- Best presentation award, XIX IAVSD Symp., "DYNAMICS OF VEHICLES onroads and tracks": "A new methodology for vehicle sideslip angle identification: comparison with experimental data.
- Best Paper that Addresses a Problem for Railway Vehicles: "Cross-Wind Aerodynamic Forces On Rail Vehicles: Wind Tunnel Experimental Tests And Numerical Dynamic Analysis", presented at the World Congress of Rail Research WCRR'03

He is a member of the editorial board of:

-INTERN. JOURNAL OF VEHICLE SYSTEM MODELING AND TESTING  
INTERSCIENCE PUBLISHERS UK

-INTERN. JOURNAL OF VEHICLE PERFORMANCE, INTERSCIENCE PUBLISHERS  
UK

- RAILWAY ENGINEERING

-SCIENCES AND RESEARCH AREA C SCIENCES OF ENGINEERING AND  
ARCHITECTURE SCIENTIFIC SECTOR 09 INDUSTRIAL AND INFORMATION  
ENGINEERING.

He was part of the technical committee and Chair (July 2018) of the International Conference of Electrical and Electronic Technologies for Automotive.

Reviewer of some journals including Journal of Mechanical Engineering Science, SAE International, Recent Patent and Engineering, Vehicle Systems Modeling and Testing, International Journal of Vehicle Design, International Journal of Vehicle Structure and Systems, Computer Methods in Applied Mechanics and Engineering, Journal of Process Mechanical Engineering, Vehicle System Dynamics, Journal of Wind Engineering and Industrial Aerodynamics.

Responsible for the Road Vehicle Dynamics (RVD) research group of the Department of Mechanics of the Politecnico di Milano.

He is part of the management committee of the interdepartmental laboratory: I\_DRIVE of the Politecnico di Milano INTERACTION BETWEEN DRIVER ROAD-INFRASTRUCTURE VEHICLES AND ENVIRONMENT, for the use of a static driving simulator for the study of 5G on ADAS, connected and autonomous vehicles.

For years he has been responsible for a series of research contracts between Politecnico di Milano and, among others, companies such as Pirelli Pneumatici, Bridgestone, Centro Ricerche Fiat, Ferrari Auto, Maserati, Fiat Auto as regards road vehicles. and with Firema Trasporti, Lucchini, Ansaldo Breda, Alstom and Trenitalia, Rete Ferroviaria Italiana, ATM as regards railway vehicles.

He was part of:

- the CIRTRAS interdepartmental center (Interdepartmental Center for Research on Transport) of the Politecnico di Milano;
- the Interuniversity Center for Road Safety Research;
- of the Board of Directors of L.I.R.A., the Italian Research Laboratory on Passive Safety Equipment in the field of vehicular traffic.

He actively participated, among others

He was chairman of the Mechanical Engineering course council of the Faculty of Industrial Engineering of the Politecnico di Milano and was a member of the University Didactic Coordination Body (OCD).

He is currently teaching the courses of:

- MECHANICS OF VIBRATIONS as part of the Degree in Mechanical Engineering
- VEHICLE DYNAMICS AND CONTROL as part of the Master's Degree in Mechanical Engineering

He has been advisor, co-supervisor and tutor of numerous degree and master's degree theses and doctoral theses.

He is a member of the PHD COLLEGE in mechanical engineering at POLITECNICO DI MILANO from 01-01-2006 to today

He is currently a teacher and coordinator of the courses

- MULTIBODY SYSTEM DYNAMICS
- HIGH PERFORMANCE COMPUTING IN MULTIBODY DYNAMICS

as part of the PhD courses in "Mechanical Systems Engineering" and "Aerospace Engineering".

He carried out teaching activities (seminars) (2012-2016) as part of the Master in Vehicle Engineering at the University of Modena and Reggio Emilia.

Responsible for Team Dynamis PRC racing department of the Politecnico di Milano which since 2004 competes in the international Formula SAE championship.

He is the author of 6 books:

- F.Cheli, G. Diana: Kinematics and dynamics of multibody systems, Spiegel Editions, 2009;
- F.Cheli, A.Manenti: Notes on hydrodynamic lubrication, Spiegel Editions, 2010;
- F.Cheli, G. Diana: Dynamics of mechanical systems, vol. 1 and 2, Polipress Milan, 2010;
- F.Cheli, E. Pennestrì: Kinematics and dynamics of multi-body systems, vol. 1 and 2, Ambrosiana Publishing House, 2009
- F. Braghin, F. Cheli, S. Maldifassi, S. Melzi, E. Sabbioni: The Engineering Approach to Winter Sport, Springer editor, New York 2016
- F.Cheli, G.Diana: Advanced Dynamic of Mechanical Systems, Springer editor, 2016.

He was a member of the Board of the GMA (Italian Group of Applied Mechanics) and was President of the Italian Group of Applied Mechanics (from 2013 to 2017).

He is part of the kinematics and dynamics group of Multibody Systems of the Italian Association of Theoretical and Applied Mechanics (AIMETA).

He is part of the GaDes group: dynamics and stability of AIMETA.

On 14 July 2010 he was appointed member of the Scientific Committee of the Silvio Tronchetti Provera Foundation.

He was a member of the Board of Directors of the Politecnico di Milano Foundation.

Starting from 23th June 2011 was appointed Resident Correspondent Shareholder of the Istituto Lombardo della Accademia di Scienze e Lettere (classe di Scienze Matematiche e Naturali, sezione di Ingegneria ed Architettura).

He took part in the technology transfer, as shareholder, during the constitution of a new company (E\_CO spin off of the Politecnico di Milano (2012) and in the development of 10 patents about road tyre and electric vehicles.

He has had the scientific responsibility for international and national research projects, admitted to funding on the basis of competitive calls that provide for peer review, including;

- **TROWS** - TIRE AND ROD WEAR AND SLIP ASSESSMENT (IV EUROPEAN COMMUNITY FRAMEWORK PROGRAM)

- **WEATHER** - Wind Early Alarm System for Terrestrial Transport Handling Evaluation of Risks (VI European Community Framework Program)

- **SPURT** - Seamless Public Urban Rail Transport (VI European Community Framework Program)

- **TECNOBIM** - Study of new technologies for bimodal vehicles (Bando Regione Lombardia - Regione Lombardia)

- **TEXTRA**: INNOVATIVE TECHNOLOGIES AND MATERIALS FOR TRANSPORT (NOTICE PUBLIC-PRIVATE MIUR WORKSHOPS)

- PROJECT: DM26035 **HIGHLY INNOVATIVE MOTORCYCLES WITH DIRECT INJECTION ENGINES WITH VERY LOW EMISSIONS** (FIRB MIUR Call)

- **ECCE** - Engineering observatory on Competence based Curricula for job Enhancement (Lifelong Learning Program - Erasmus Multilateral Project - VII Framework Program - European Community)

- **Safer Helmets** (Cariplo Foundation advanced materials)

- **TEINVEIN** - Innovative Technologies for Intelligent Vehicles: development of innovative technologies, new components and / or subsystems for active and preventive safety, funded by the Lombardy Region started in April 2017

- **5G trial in the Milan metropolitan area**: MOBILITY AREA (2017)

Urban Cross Traffic Cooperative: increased mobility safety thanks to a substantial "extension" of the driver's vision range and the potential improvement of the performance of the anti-collision safety systems created through the acquisition, via sensors on the vehicles themselves and on the road infrastructures .conditions.

- **Joint Research Laboratory of the Politecnico di Milano (JRL**, scientific director) for autonomous and connected electric urban mobility. The JRRL is an ecosystem that includes universities (Politecnico di Milano and Fondazione Politecnico di Milano), industry (ABB, ATM, Brembo, Enel - X, IBM, Pirelli, STM, Vodafone, the Municipality of Milan and the Milan Chamber of Commerce); deals with the issue of electric, connected and autonomous vehicle.

- Polisocial Politecnico di Milano **EMotion project**: Eritrean mobility and cultural heritage. New Frontiers of the Horn of Africa.

- **BASE-5G** Broadband Interfaces and services for Smart environments connected to 5G technology in the Smart Cities and Smart Campus areas. The objectives of the BASE 5G project is to explore, identify and define the various elements of the design processes necessary to ensure vertical integration of 5G technology with IoT platforms, in order to support the development mobility.