

# MUZIO M. GOLA

EMERITUS PROFESSOR OF THE POLITECNICO DI TORINO

SOCIO CORRISPONDENTE – ACCADEMIA DELLE SCIENZE DI TORINO

POLITECNICO DI TORINO

DIMEAS - DIPARTIMENTO DI INGEGNERIA MECCANICA E AEROSPAZIALE

corso Duca degli Abruzzi 24

10129 Torino

+39 335 530 4868 (mobile)

Mail: [muzio.gola@polito.it](mailto:muzio.gola@polito.it), [muzio.gola46@postecert.it](mailto:muzio.gola46@postecert.it)

POLITO: <https://www.polito.it/personale?p=muzio.gola>

ORCID: <https://orcid.org/my-orcid?orcid=0000-0002-7279-4722>

SCOPUS: <https://www.scopus.com/authid/detail.uri?authorId=7006108085>



## In brief

Born 1946, “Laurea” degree Ingegneria Meccanica , Politecnico di Torino. Professor of Machine Design. Specialist in theoretical and experimental mechanics, failure analysis, machine components, turbomachinery, structural dynamics and vibrations. Academic career at Politecnico di Torino, up to retirement on Oct. 31st, 2016. Emeritus Professor of Politecnico di Torino, DIMEAS (Dept. Mech. Aerospace Eng.).

<b>Scientific area</b>	0009-Industrial and information engineering																				
<b>Nationality</b>	Italian																				
<b>Date of birth</b>	30.5.1946																				
<b>POSITIONS, history</b>	<p>until 31/10/2016, Full Professor of Machine Design (Costruzione di Macchine) ING-IND / 14, Dept. DIMEC (Dept. of Mechanics) later DIMEAS, Politecnico di Torino</p> <p>appointed full professor on 5.15.1987, permanent confirmation on 5.16.1990.</p> <p>from 11/80 to 5/87, Associate Professor of Machine Design, DIMEC (Dept. of Mechanics), Politecnico di Torino</p> <p>from 8/73 to 11/80, Assistant Professor to the Chair of Construction of Machines and Technologies, Istituto della Motorizzazione, Politecnico di Torino</p> <p>from 11/71 to 8/73, Istituto di Macchine, Politecnico di Torino, Researcher</p>																				
<b>EDUCATION</b>																					
• 1965/71	Politecnico di Torino, “Laurea” in Mechanical Engineering on 30.7.1971, Torino, Italy																				
• 1960/65	Liceo Scientifico Orazio Grassi (Scientific High School), Savona, Italy																				
<b>PERSONAL SKILLS</b>																					
MOTHER TONGUE	<b>ITALIANO</b>																				
OTHER LANGUAGES	<table border="1"> <thead> <tr> <th>Language</th> <th>Read</th> <th>Understood</th> <th>Spoken/written</th> </tr> </thead> <tbody> <tr> <td>English</td> <td>◆◆◆◆</td> <td>◆◆◆◆</td> <td>◆◆◆◆</td> </tr> <tr> <td>French</td> <td>◆◆◆◆</td> <td>◆◆◆◆</td> <td>◆◆◆</td> </tr> <tr> <td>Spanish</td> <td>◆◆◆◆</td> <td>◆◆◆</td> <td>◆◆</td> </tr> <tr> <td>German</td> <td>◆◆</td> <td>◆</td> <td>◆</td> </tr> </tbody> </table>	Language	Read	Understood	Spoken/written	English	◆◆◆◆	◆◆◆◆	◆◆◆◆	French	◆◆◆◆	◆◆◆◆	◆◆◆	Spanish	◆◆◆◆	◆◆◆	◆◆	German	◆◆	◆	◆
Language	Read	Understood	Spoken/written																		
English	◆◆◆◆	◆◆◆◆	◆◆◆◆																		
French	◆◆◆◆	◆◆◆◆	◆◆◆																		
Spanish	◆◆◆◆	◆◆◆	◆◆																		
German	◆◆	◆	◆																		
<b>QA, EVALUATION AND ACCREDITATION</b>	Quality Assurance, Evaluation and Accreditation activities from p. 24, gray background.																				

**PROFESSIONAL ACTIVITY**

Since 1978, regular activity as a forensic technical expert for Courts, Prosecutors and private clients. On matters relating to mechanical design, safety of structures and machinery, analysis of accidents at work and compliance with safety regulations; important experience from the non-academic world.

**SERVICE ACTIVITIES  
AT POLITECNICO DI  
TORINO**

- From 2014 to 2016.10, member of the University Quality Presidium
- from 2012.03 to 2016.10, Vice-Rector for Quality
- 2008, appointment by the Dean of the I Faculty of Engineering, member of the Emeritus Professorship Committee
- from 2007 to 2016, Director, CEQUA-University Quality Center
- from 2005 to 2012, Vice-Rector for Quality, Evaluation and Accreditation
- from 2005.12 to 2006.30, rectoral appointment to the Bibliometric Criteria Committee
- from 2003 to 2007, Member of the University Resources Commission - CRA
- from 2003 to 2007, Director, DIMEC - Department of Mechanics,
- from 2002 to 2005, Rector's Delegate for Quality, Evaluation and Accreditation of Teaching
- from 2000.10 to 2002.4 member of the Executive Committee for Educational and Research Self-Assessment
- from 1999 to 2002, Vice Dean, 1st Faculty of Engineering
- from 1994 to 1999, President of the CPD, Joint Committee for Didactics
- 1993, member of the Joint Committee for Didactics
- 1992, member of the Committee for relations with the Academy of Sciences of the former Soviet Union
- from 1990 to 2003 Coordinator of the PhD course "Design and Construction of Machines"
- from 1985/86 to 1996/97, member of the Board of DIMEC - Department of Mechanics
- 1981-1992, member of the University Commission for Departmental Experimentation

**CO-ORDINATION  
RESPONSIBILITIES**

- 2012 Coordination of the operations for the quality certification and EUR-ACE Accreditation of the CdS: CL\* in Aerospace Engineering, CLM in Aerospace Engineering, CL in Automotive Engineering, CLM\* in Automotive Engineering, CL in Building Engineering, CLM in Building Engineering, CL in Electronics Engineering, CLM in Electronics Engineering
- from 2008.3.21 to the end of 2009, coordination of the Quality Assurance Group for the development of the INFORMATION MODEL (of QA) on-line at the Politecnico di Torino (all CdS)
- from 2004 to 2016: founder and leader of the DIMEC section of the LAQ (High Quality Laboratory) "AERMEC"<sup>1</sup>  
[https://www.dimeas.polito.it/en/research/research\\_groups/laq\\_aermec\\_for\\_gas\\_turbine\\_and\\_compressor\\_blades](https://www.dimeas.polito.it/en/research/research_groups/laq_aermec_for_gas_turbine_and_compressor_blades)
- from 2003 to 2007, development of the Operating Manual for the Accreditation of the operating offices Macrotype B (Piedmont Region) and coordination / preparation for the accreditation visits and subsequent six-monthly surveillance visits to the Polytechnic of Turin
- from 1997 to 2000 and from 2001 to 2003, Scientific coordinator of the joint FIAT AVIO / Politecnico di Torino project on vibration and damping of blades and on thermal transients and fatigue in aircraft engine discs
- from 1989 to 1994, Scientific manager of the sub-project "Robotic Structures - Modular Structures - Light Modular Robots" of the CNR "Robotics" Program, contract "Robot in composite materials: innovative projects and their dynamic evaluation"
- from 1997/98 to 2013-14, Coordinator of the TOP-UIC joint degree program of the Politecnico di Torino and UIC, University of Illinois at Chicago
- from 7/1988 to 9/1988 and from 7/1989 to 10/1989, missions in Srinagar,

<sup>1</sup> See last page

**TEACHING**

Kashmir - India, Executive Coordinator of the cooperation program "Program for the establishment of Maintenance Engineering Center", Italian Ministry of Foreign Affairs and Regional Eng . College Srinagar (*laboratory design, choice of equipment, supervision of the design of the new building, coordination of teaching activities held in Srinagar*)

\* NOTE: CL=Bachelor degree course, CLM: Master Degree Course

- 2011-12 to 2016-01 , **“Costruzione di motori per aeromobili”** (Aircraft engine construction), LM “Ingegneria Aerospaziale”, Politecnico di Torino
- 2011-12 to 2016-06 , **“Machine design”**, LM “Ingegneria Meccanica”, english language track, Politecnico di Torino
- 2012 and 2014, lectures of the module "The design of engine sub-systems: turbine, combustor and mechanical transmissions", of the Master Univ. II Level in Propulsion Systems Engineering (AVIO Group); supervision of n. 4 "Case Studies"
- 2006, 2007, development of material and recordings for the CETEM-POLITO distance course **Mechanical Behavior of Materials**,  
[http://corsiadistanza.polito.it/on-line/CMM\\_flv/index.htm](http://corsiadistanza.polito.it/on-line/CMM_flv/index.htm)  
<http://corsiadistanza.polito.it/diplomi/medioteca/cdrom.php>
- 1997/98 to 2010-11, **Current topics in mechanical engineering** , “TOP-UIC” joint degree program of POLITO and University of Illinois Chicago
- 1992/93 to 2010-11, **Costruzione di macchine (Machine Design)**, CLM “Ingegneria Aerospaziale”, Politecnico di Torino
- 1995/96 to 2009/10, **Comportamento meccanico dei materiali**, CLM “Design del prodotto eco-compatibile”, Politecnico di Torino
- 1996, 1997, development of material and recordings for the NETTUNO distance course **Comportamento Meccanico dei Materiali e Affidabilità e Sicurezza delle Costruzioni Meccaniche** ("Mechanical Behavior of Materials" and "Reliability and Safety of Mechanical Constructions")
- 1992/93 to 1997/98, **Affidabilità e Sicurezza delle Costruzioni Meccaniche** (Reliability and Safety of Mechanical Constructions), CL “Ing. Gestionale”, Politecnico di Torino
- 1984/85 e 1985/86, **Costruzione di macchine** (Machine Design), CLM “Ing. Meccanica”, sede di Novara del Politecnico di Torino
- 1980/81 to 1991/92, **Costruzione di Macchine per l’Industria Chimica** (Mechanical Design for the Chemical Industry), CLM “Ing. Chimica”, Politecnico di Torino
- 7/1981 to 12/1981 and 7/1983 to 12/1983, **Costruzione di Macchine** (Machine Design), National University of Somalia in Mogadishu (program commissioned by the Italian Ministry of Foreign Affairs)
- 1979/80 e 1980/81, **Analisi Strutturale dei Componenti Nucleari** (Structural Analysis of Nuclear Components) CLM “Ing. Nucleare”, Politecnico di Torino
- 1976/77 to 1978/79, **Meccanica Biomedica**, (Biomedical Mechanics) Politecnico di Torino

**STUDENT EVALUATIONS (APPENDIX 1)**

Academic year	Module name	Code	Module ranking	Teacher ranking
			Average of all questions	Ave. D9 - D10 - D11 - D12 - D13
2015/16	Machine design	03MCHQD	<b>3,52</b>	<b>3,76</b>
2015/16	Costruzione di motori per aeromobili	01LKCMT	<b>3,43</b>	<b>3,80</b>
2014/15	Machine design	03MCHQD	<b>3,56</b>	<b>3,65</b>
2014/15	Costruzione di motori per aeromobili	01LKCMT	<b>3,4</b>	<b>3,94</b>
2013/14	Machine design	03MCHQD	<b>3,54</b>	<b>3,74</b>
2013/14	Costruzione di motori per aeromobili	01LKCMT	<b>3,51</b>	<b>3,92</b>

## RESEARCH INTERESTS IN ENGINEERING SCIENCES

Research initially, 1975, characterized by biomechanics, in particular ballisto-cardiography, hip replacement design, gait analysis. Research sector closed around 1983, except for investigations on external fixators for bone fractures in the early 1990s.

Later, research concerned X-ray diffractometry, and ultrasonic techniques; professional experiences on non-destructive tests (NDE): X-rays, Ultrasound, Penetrants, Magnetoscopy, (ASNT level II qualification for ultrasound examinations)

In the period 1989-1994, Scientific Responsible of the sub-project "Robot Structure - Modular Structures - Light Modular Robots" in the "Robotics" Program of the CNR, contract "Robot in Composite Materials: innovative projects and their dynamic evaluation".

From 1997 to the present, the main area of research has focused on the mechanical aspects of the aircraft turbine engine, such as: vibration and damping of turbine blades, underplatform damper theory and experiment, contact mechanics in friction and wear up to 1000° Celsius, thermal transients and fatigue in aircraft engine bladed disks.

Since 2004, this research has been developed entirely within the LAQ (High Quality Laboratory) "AERMEC," of which I was the founder and team leader until 2016. Realization of original and innovative experimental equipment installed in the LAQ-AERMEC

## RESEARCH AND TECHNOLOGICAL TRANSFER CONTRACTS PROJECTS, MANAGEMENT 2000 TO 2016

**Total gross value of contracts 2004/2016: over 4 million € (APPENDIX 3)**

### Consultancy and research contracts

- 2015 (Johnson Electric Asti s.r.l.) Reliability analysis methods of PCBA (Printed Circuit Board Assembly) for fan brushless motors
- 2013-2014 (AVIO) Wear tests New alloys for Z-Notch
- 2013-2014 (AVIO) T800 wear tests for GE90
- 2013-2014 (GATE s.r.l. - Johnson Electric) Design and testing methodologies of electronic boards of electric motors for fans and conveyor fan system
- 2013-2014 (Mitsubishi-Hitachi) Research on friction damping and friction model at contact surfaces of turbine blades
- 2012-2013 (GATE s.r.l. - Johnson Electric) Test methodologies and analysis of thermal and mechanical fatigue for electronic control boards of electric fans
- 2012-2014 (GENERAL ELECTRIC - NUOVO PIGNONE) Extension of calculation codes for the dynamic analysis of steam turbine blades (HS blades and control stage)
- 2012-2014 (GENERAL ELECTRIC - NUOVO PIGNONE) Experimental tests for the characterization of wear on the roofs of low pressure blades HS for steam turbines
- 2012-2013 (GENERAL ELECTRIC - NUOVO PIGNONE) Control stage - Static test with two blades and different damper geometries - Numerical-experimental validation
- 2011 (GENERAL ELECTRIC - NUOVO PIGNONE) Analytical simulation of an exciting magnet for dynamic response tests on steam turbine blades
- 2010-2012 (GENERAL ELECTRIC - NUOVO PIGNONE) Numerical and experimental investigations on HS low pressure blades for steam turbines
- 2009-2011 (AVIO) Partnership - Development of advanced methodologies for the prediction and experimental verification of the wear behavior of surface coatings for new generation turbine applications
- 2008-2012 (AVIO) Study and development of calculation models and design of damper ring systems for aeronautical applications
- 2008, (LISA-POLAND) New technologies for sheet metal stamping

- 2007-2008 (RINALDI) Determination of the thermal reduction of a heat shield made of multi-layer sheet metal 2007-2010 (AVIO) Combined cycle fatigue tests on CMSX4 tubes within the European research program PREMECCY
- 2007-2007 (AVIO) Study of dynamic phenomena of the turbine blade disc in the presence of asymmetric effects (mistuning) - LAQ AERMEC
- 2007-2008 (AVIO) High temperature tribological survey for the evaluation of the damping parameters and related wear effect for aeronautical materials
- 2005-2006 (ALSTOM Ferroviaria) Support for the analysis of the results of predictive models of motion sickness and their correlation with experimental tests
- 2005-2006 (AVIO) Review of the design of the under blade dampers of the first stage of the LMS 100 IPT turbine
- 2004 (AVIO) Experimental and numerical evaluation of the damping due to the under blade dampers in the first stage of the LMS100 IPT turbine
- 2001-2004 (AVIO) Study of the optimization of the fatigue and vibrational behavior of critical components of turbomachinery
- 2001 (SKF Industrie S.p.A.) Design of calibration devices and execution of diffractometric measurements to determine the residual stress state in roll-bearing rings

#### **PRIN-MIUR (national projects Ministry Education and Research)**

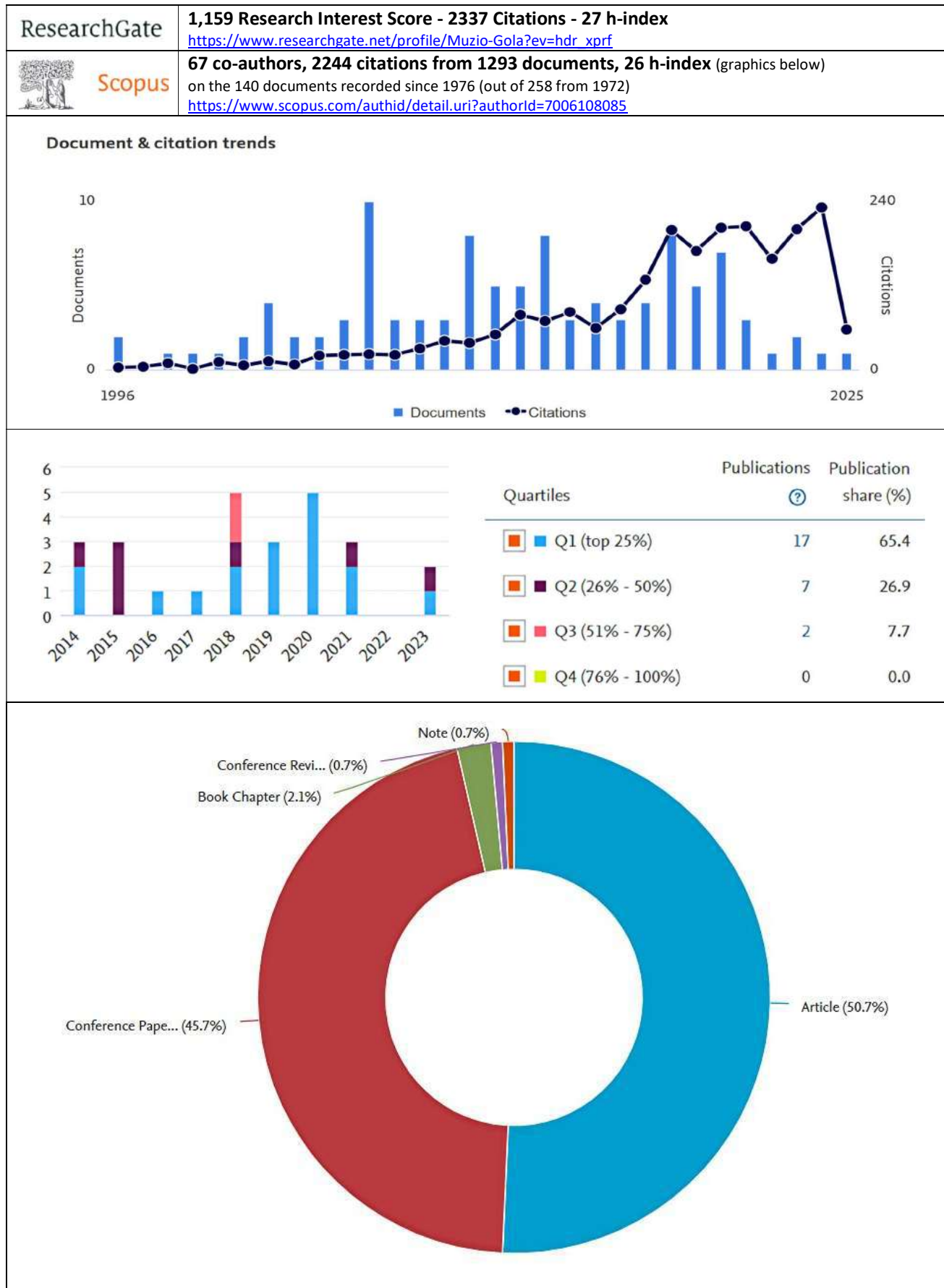
- 2007-2009 Development and validation of models for damper-induced mistuning
- 2002-2004 Determination of friction parameters in vibrating contacts for passive dampers of aviation turbine blades: experimentation on dedicated benches, models of the contact and under-blade dampers, numerical validation of the dynamic response of blade systems in controlled laboratory conditions

#### **European Union Research Projects**

- 2012-2015 UPGRADE (Marie Curie) - complex dynamic interactions of nonlinear, multistage and localization phenomena in turbine engines: development and validation of efficient and accurate modeling techniques
- 2008-2012 FUTURE Flutter-Free Turbo machinery Blades - European Union 7th FP-UE (AVIO)
- 2008-2011 DREAM - Validation of radical engine architecture systems
- 2005-2009 VERDI - Virtual engineering for robust manufacturing with design integration
- 2005-2009 VITAL - Environmentally friendly aero engine

#### **Research Projects on Regional and National Structural Funds**

- 2014-2017, CLUSTER - Greening the propulsion
- 2012 - 2014 GREAT 2020 - fase 2 - Green engine for air traffic
- 2009 - 2011 GREAT 2020 - fase 1 - Green engine for air traffic
- 2007-2010 CORALE - Development of an integrated simulation system for the collaborative design of a low environment impact aeroengine
- 2005-2007 E10 - Models and design criteria for mistuning in turbomachinery



## PAPERS IN ENGINEERING SCIENCES AND TECHNOLOGIES

### N. AUTHORS, TITLE, BIBLIOGRAPHIC DATA

- 1 ANTONELLI E., GOLA M.M., - "Motori rotativi a combustione interna", Enc. Ing., II-7.20, ISEDI, Milano, , 7.327-7.340, 1972
- 2 GOLA M.M. - "Metodi numerici per la scelta fra profili di camme", ATA, 26-3, , 149-154, 1973.03
- 3 GOLA M.M. - "Profili statorici di motori Wankel ottenuti per inviluppo", ATA, 26-6, 149-154, 1973.06
- 4 GOLA M.M. - "Proposta per utilizzare le macchine della classe KKM-ka come motori endotermici", ATA, 27-8,, 426-432, 1974.08
- 5 CALDERALE P.M., GOLA M.M. - "A new ULF-BCG: two degrees of freedom, air bearings, hyperboloidic surface", 4th World Congr. Ball. Card. Dyn., Amsterdam 1975; Biblthca Cardiol.,35, 75-81, Karger, Basel, 1976
- 5b "Miglioramento dell'accoppiamento uomo-tavolo in ballistocardiografia", III Congr. Naz. AIMETA, Cagliari, 3/22.1-22.12, 1976.10
- 6 CALDERALE P.M., GOLA M.M. "Protesi interne di articolazione", Enciclopedia dell'Ingegneria, IX-2.1, ISEDI , Milano, 2.34-2.40, 1976
- 7 ATZORI B., GOLA M.M. - "Sulla determinazione delle velocità critiche degli alberi rotanti", Ingegneria Meccanica, 25-1, 34-40, 1976.01
- 8 COLASURDO G., GOLA M.M.,- "Caratteristiche cinematiche di elementi di tenuta in macchine KKM-ka 3/2", ATA, 29-3, 133-137, 1976.03
- 9 COSTANZO S., FERRARIS R., GOLA M.M., SINISTRERO G., SISMONDI P. - "La radioterapia endocavitaria del carcinoma del collo dell'utero con apparecchio modellato e dosimetria con elaboratore", La Radiologia Medica, Vol. 62 n. 5, 369-380, 1976.05
- 10 GOLA M.M, LUGANO F. - "Calcolo di sistemi tubieri piani: metodo di rigidità e carichi nodali equivalenti", ICP, 5-6, 85-90, 1976.06
- 11 GOLA M.M. - "Piattaforme dinamometriche per misure biomeccaniche", Tecnica Ospedaliera, 6-9, 52-58, 1976.09
- 12 GOLA M.M., VULLO V. - "Analisi teorica di fondi curvi di forma superellittica", III Conv. Naz. AIMETA, Cagliari, 2/28.1-28.14, 1976.10
- 13 GOLA M.M. - "Una nuova piattaforma dinamometrica: analisi teorica e sperimentale", III Conv. Naz. AIMETA, Cagliari, 3/23.1-23.12, 1976.10
- 13b "A statically determinate force plate: theoretical analysis and experimental confirmation", First Mediterranean Conf., Medical Biological Engineering, Sorrento, I/1.33-1.36, 1977.09
- 14 CALDERALE P.M., GOLA.M.M., GUGLIOTTA.A.- "Nuovi metodi dell'ingegneria per lo studio dell'accoppiamento osso-protesi", Tecnica Ospedaliera, n. 2, 1977.02
- 15 BELINGARDI G., GENTA G., GOLA M.M. - "Optimization of orthotropic multilayer cylinders and rotating discs", L'Aerotecnica Missili e Spazio, 1977.03 [link](#)
- 16 CALDERALE P.M., GOLA.M.M., GUGLIOTTA.A.- "Ballistocardiografia e meccanica del sistema cardiovascolare", Tecnica Ospedaliera, 7-4, 40-47, 1977 04
- 17 GOLA.M., GUGLIOTTA .A. - "Ballistocardiographic facilities at the "Politecnico di Torino", Experimental device and analysis techniques", Ist Mediterranean Conf. Medical Biological Engineering, Sorrento, I/1.107-1.109, 1977.09
- 18 BELINGARDI G., GENTA G., GOLA M.M. - "Una applicazione del principio dei lavori virtuali al calcolo di dischi rotanti in materiale anisotropo", V Conv. Naz. AIAS, Bari, I/15.1-15.12, 1977.09-10
- 18b "A study of the stress distribution in rotating orthotropic discs", Composites, 77-80,1979.04
- 19 BELINGARDI G., GENTA G., GOLA M. - "Ovalization critical speeds in anisotropic rotating disks", 1977 Flywheel Technology Symp., 441-448, San Francisco, 1977.10
- 20 GOLA M.M., GUGLIOTTA A., VULLO V. - "Rappresentazione e tolleranze di profili trocoidali", II Conv. Naz. ADM, St. Vincent, 1-III,23.1-23.12., 1978-03
- 21 GOLA M.M., GUGLIOTTA A. - "Minimum average configuration for a set of "n" independent BGG events", 11th Europ. Congr. Ballist., Ljubljana, 37-10, 113-118, 1978.03

- 22 CALDERALE P.M., GOLA M.M., GUGLIOTTA A. - "Newly built facilities for ballistocardiography at the polytechnic of Turin", 11th Europ. Congr. Ballist., Ljubljana, 37-9, 109-111, 1978.03
- 23 BARBERI G., GOLA M., GUGLIOTTA A., CALDERALE P.M. - "Analytical considerations on the mechanical stem femur coupling", Congr. Europ. Soc. Biomech., Bruxelles, 216-222, 1978.05, Acta Orthopaedica Belgica, 46,6, 728-734, 1980
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- 26 BARBERI G., CALDERALE P.M., GOLA M.M., GUGLIOTTA A. - "Flexural coupling of hip prosthesis stem and femur: a simple method of theoretical analysis", Engineering in Medicine, 3, 172-178, 1978.07
- 27 GOLA M.M., GUGLIOTTA A., NICOLOTTI G.C. - "Proposta costruttiva di macchina KKM-ka 3/2", ATA, 31-7/8, 326-331, 1978.07-08
- 28 GOLA M.M., GUGLIOTTA A. - "Calcolo non assialsimmetrico dei recipienti in pressione", ICP, VI n. 12, 49-54, ERIS, Milano, 1978.12
- 29 GOLA M.M., GUGLIOTTA A. - "Analytical estimate of stress in bones and prosthesis stems". Journal of Strain Analysis, 14-1, 29-33, 1979.01
- 29b "Analytical estimate of bone-prosthesis coupling", VI International Congr. Biomech., Copenhagen, 1977.07
- 29c "Calcolo delle caratteristiche di accoppiamento stelo-manicotto", V Conv. Naz. AIAS, Bari, I/12.1-12.12, 1977.09-10
- 29d "An approximate analytical method for the design of arthroprosthesis stems", Ist Mediterranean Conf. Medical Biological Engineering, Sorrento, II/1.77-1.79, 1977.09
- 30 CALDERALE P.M., GOLA M.M., GUGLIOTTA A. - "New theoretical and experimental developments in the mechanical design of implant stems", Pauwels Symposium, Freie Univ., Berlin, 199-208, 1979.01
- 31 GENTA G., GOLA M.M. - "Whirl and critical speeds of flywheel-container systems aboard vehicles", Meccanica, 14-1, 1979.03.
- 32 GENTA G., GOLA M.M. - "Dynamic behaviour of flywheel heat engine hybrid vehicles", Science Motor Vehic., Bled, Jugoslavia, 376-387, 1979.06
- 33 CALDERALE P.M., GOLA M.M., GUGLIOTTA A. - "Analisi teorica e sperimentale dello stato di tensione in steli protesici", VIII Conv. Naz. AIAS, Cagliari, 2.61-2.72, 1979.09
- 33b "Mechanical stress distribution in stems of implants", Biomechanics VII, 3A, Warszawa, 373-379, 1979.09
- 34 GOLA M.M. - "Mechanical design, constructional details and calibration of a new force plate", Journal of Biomechanics, 13-2, 113-128, 1980.01
- 35 GENTA G., GOLA M.M. - "Dynamic problems in the mechanical design of flywheel- heat engine hybrid vehicle", XVIII Intern. Congr. FISITA, Hamburg, 1980.05, VDI Berichte, 370, 4.2.3., 99-104, 1980
- 35b "Dimensionamento di alberi e sopporti per volani ad alta densità di energia: problemi dinamici", VII Conv. Naz. AIAS, Cagliari, 3.15- 3.26, 1979.09
- 36a GOLA M.M., GUGLIOTTA A. - "La meccanica della frattura nel progetto di recipienti in pressione", ICP, VIII n. 3, 21-25, ERIS, Milano, 1980.03
- 36b "Dimensionare con la meccanica della frattura un recipiente in pressione", Progetto, II n. 9, 40-44, ERIS, Milano, 1980.09
- 37 CALDERALE P.M., GOLA M.M., GUGLIOTTA A. - "Experimental results for stem-femur coupling loaded in bending", AI II-LEA, Simpozion National de Tensometrie, Cluj-Napoca, Romania, 3-11, 1980.06
- 37b "Systematic approach to the experimental and theoretical study of hip prosthesis coupling", I World Biomat. Congr. Baden near Vienna, 1980.04; Advan. Biomat., 3, J.Wiley & Sons, chap. 17,113-119;
- 37c "Analisi teorica e sperimentale dello stato di tensione in steli protesici /II/", VIII Conv. Naz. AIAS, Firenze, 556-565, 1980.09
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- 38 GENTA G., GOLA M.M., GUGLIOTTA A. - "Remarks on the stress state in rotating orthotropic disks", Flyw, Tech. Symp., Scottsdale, Arizona, 1980.10;
- 38b "Axisymmetrical stress state in orthotropic rotating disks", V Cong. Naz. AIMETA, Palermo, III/209-218, 1980.10
- 38c "Axisymmetrical computation of the stress distribution in orthotropic rotating discs", Int. Journ. of Mech. Science, 24,1, 21-26, 1982.01
- 38d 1979 – BELINGARDI G., GENTA G., GOLA M., – "A study of the stress distribution in rotating, orthotropic discs, Composites 10(2):77-80
- 39 BERTINO M., FURXHI G., GOLA M.M. - "Microcomputer control for a 5 axis manipulator with cartesian path control", Int. conf. Cybernetics and Society, IEEE, Cambridge, Mass., 1980.10
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- 239 bis ... Reduced-Order Modeling Friction for Line Contact in a Turbine Blade Damper System, Chapter in book: Nonlinear Dynamics and Control, DOI: 10.1007/978-3-030-34747-5\_20, January 2020, [https://link.springer.com/chapter/10.1007%2F978-3-030-34747-5\\_20](https://link.springer.com/chapter/10.1007%2F978-3-030-34747-5_20) [link](#)
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- 252 GASTALDI C., GOLA M.M., A Method to Minimize the Effort for Damper–Blade Matching Demonstrated on Two Blade Sizes. Appl. Sci. 2021, 11, 5171. <https://doi.org/10.3390/app11115171> [link](#)
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**INVITED LECTURES & KEYNOTE PRESENTATIONS (from 2017)**

- ATCES 2017, Samara University, Russia, September. 28-30th, 2017: A DECADE OF RESEARCH ON "SOLID" UNDERPLATFORM DAMPER MECHANICS AT AERMEC – POLITO, [link](#)
- 1st SDJS - Symposium on the Dynamics of Jointed Structures November 3-5 2017, Northwestern Polytechnical University Xi'an China: 2007-2017: A DECADE OF RESEARCH ON "SOLID" UNDERPLATFORM DAMPER MECHANICS AT AERMEC – POLITO, [link](#)
- 3rd SDJS - Symposium on the Dynamics of Jointed Structures May 27-28 2019 Nanjing China: IMPROVING AND REVISING IDEAS ON UNDERPLATFORM DAMPER RESEARCH AT AERMEC – POLITO", [link](#)
- COBEM - 25th ABCM International Congress of Mechanical Engineering, Oct. 20-25, 2019, Uberlândia, MG, Brazil, REVISING AND IMPROVING IDEAS ON TURBINE UNDERPLATFORM DAMPER RESEARCH AT AERMEC-POLITO, [link](#)
- 2021 International Bhurban Conference on Applied Sciences and Technologies (IBCAST), 12 - 16 Jan 2021, Prof. Abdus Salam Centre for Physics, Islamabad, Pakistan: AN UPDATED 2020 OVERVIEW OF TURBINE BLADE UNDERPLATFORM DAMPING RESEARCH AT AERMEC-POLITO", [link](#)
- 2021 Silk Road International Symposium on the Cooperation and Integration of Industry, Education, Research and Application of Aeronautics and Astronautics , Oct 29, 2021, Xi'an, China: VIBRATION MITIGATION IN TURBOMACHINERY - THE NON-LINEAR DAMPER-BLADE MATCHING BOILS DOWN TO THE ESSENTIALS, [link](#)
- BUAA online joint seminar Nov. 23, 2021: VIBRATION MITIGATION IN TURBOMACHINERY - THE NON-LINEAR DAMPER-BLADE MATCHING BOILS DOWN TO THE ESSENTIALS, [link](#)
- 19<sup>th</sup> International Bhurban Conference on Applied Sciences and Technology, 16-20 August 2022: VIBRATION MITIGATION IN TURBOMACHINERY – A RATIONAL UNIFIED APPROACH TO SOLID UNDERPLATFORM DAMPERS, [link](#)
- BUAA (Beijing) - Polito-Beihang Bilateral Academic Seminar 2024 - 都灵理工-北航双边学术研讨会 2024 - supported by the High-end Foreign Expert Exchange Project of China Ministry of Science and Technology – Kickoff of BLADE TAMER BEIHANG-POLITO Joint Laboratory - 2024 February 19-23 [link](#)
- NUAA (Nanjing University of Aeronautics and Astronautics) – Seminars for doctoral students within the 短期外国专家离岸国际合作交流协议 - OFFSHORE INTERNATIONAL COOPERATION AGREEMENT FOR SHORT-TERM FOREIGN EXPERTS – 2024 April 9-12 [link](#) [link](#) [link](#)

**QUALITY ASSURANCE,  
EVALUATION,  
ACCREDITATION**

The activity was developed on three main fronts:

- Study, development and test/routine application of systems to address various aspects of Quality Assurance in university courses
- Formulation of guidelines for the evaluation and accreditation of university training activities
- Participation in evaluation and accreditation activities on behalf of Italian or foreign agencies

Chronologically, the following characterizing periods can be distinguished:

- 2014-2019: conducting accreditation visits, training activities for teachers and TA staff on University Quality Assurance, consultancy for the development of structures and documents for the University QA
- 2012-2014: collaboration with ANVUR as an expert for the development of the ANVUR-AVA system
- 2003-2010: activities within the Turin Polytechnic, development of the Information Model and the related QA system, development of documents and methods for the Piedmont Region Accreditation, implementation of the computerized QA system of the Turin Polytechnic in the occasion of the transition to Ministerial Decree 270/2004 of 100% of the Degree Courses at the end of 2009 (In line with the decision of the Academic Senate of 12 March 2008, the Rector provided for the establishment of the Quality Assurance Group on the 21st of October 2008 Academic Senate approved the start of the development of the online INFORMATION MODEL)
- 1999-2004: consultancy initially for the National Observatory of the University System, later for CNVSU (National committee for the evaluation of the University system), culminating in the "Information model for the accreditation of Degree Programs", Final report of the research group "Evaluation of teaching and accreditation", RdR 01-04, February 2004  
[http://www.cnvsu.it/publidoc/comitato/default.asp?id\\_documento\\_padre=11137](http://www.cnvsu.it/publidoc/comitato/default.asp?id_documento_padre=11137)
- 1997-2002: initial activity at the Polytechnic of Turin, later in the context of CRUI-CAMPUS national project

**Participation to "Presidi della Qualità di Ateneo" (University Quality Boards)**

- 2015/2021 President, Presidio Università di Scienze Gastronomiche, Pollenzo

**Participation to "Nuclei di Valutazione" (External Evaluation Boards)**

- 2020/2023 Università della Calabria
- 2020/2022 Università di Padova
- 2013/2019-01 Alma Mater Studiorum Università di Bologna (President)
- 2008/2015 Univ. degli studi di Scienze Gastronomiche, Pollenzo
- 2006/2013 Università di Trento
- 2003/2013 Università di Messina (President)
- 2002/2006 Politecnico di Milano
- 2009/2013 Università della Calabria
- 2000/2006 Università della Calabria
- 1998/2001 Università di Bologna

**Collaboration with Agencies, Bodies and other entities**

- 2015/16 Member of the "AVA Working Group", (CD ANVUR 10/2015)
- 2015.3.1 Invitation by prof. Li Huaxing, Director of "Office of International Cooperation", to visit Northwestern Polytechnical University (NPU), Xi'an, China, and to present the training experiences of the Polytechnic of Turin and Quality Assurance, in May 2015
- 2014 Nov / Dec, University of Turin, assignment for 4 training sessions for the training course "Self-Assessment, Evaluation and Accreditation for the Management of Study Programs"
- 2014-2020 registered in the ANVUR System Experts register

- 2014-15 contracted as ANVUR Expert for "Support activities for the drafting and testing of guidelines for carrying out visits by evaluation experts as part of the initial and periodic accreditation of university structures and study courses"
- 2013-2016 member of the "Scientific-Strategic Committee" of "AlmaLaurea", Bologna
- 2012-13 contracted as ANVUR Expert for "Support activities for the development of the national system for quality assurance and university evaluation"
- 2011-2013 Speaker at the ANVUR Days on AVA (Self-Assessment, Evaluation and Accreditation System): Bari 2011 11 09, Bologna 2012 11 05, Bolzano 2012 12 03, Catania 2013 02 14, Ferrara 2014 10 24, Florence 2012 03 14, Milan 2012 11 15, Modena 2013 02 25, Naples 2013 01 24, Padua 2012 11 21, Padua 2013 07 11, Palermo 2012 11 19, Rome 2012 10 29, Salerno 2013 02 26, Turin 2012 10 26, Trieste 2012 11 26
- from 2011 to 2019, member of the QUACING EUR-ACE Agency Control Room, Rome 2009-2013, elected member of Co-CONVUI, Organizing Committee "Coordination of Evaluation Nuclei of Italian Universities"
- 2008.4.22 (6 months) designated to be part of the CLESSIDRA working group of CINECA and KION to make tools available to support Quality Assurance
- 2004-2005 contract with Alma Mater Studiorum - University of Bologna, for teacher training and TA "Project accreditation of qualifications in Europe"
- 2003-2004 development of the OPERATING MANUAL for ACCREDITATION of OPERATING OFFICES Type L (Degrees) - within Macrotype B, Politecnico di Torino - GESD and PIEDMONT REGION - Vocational Training Management - Training Activity Sector
- 2002-2004 coordinator of the Evaluation and Accreditation Working Group of the CNVSU (National Committee for the Evaluation of the University System) of the MIUR
- 2002, participation in CRUI in the development of the CampusOne evaluation model
- 2001, external observer aggregated to one of the CAPES commissions (Brazil) "45 Comissões de Avaliação - 2001", for the basic areas: Mechanical engineering, production engineering, naval and oceanic engineering, marine and oceanic structures, aerospace engineering, mechanical and industrial engineering
- 2001.2.12-17 AICQ-SICEV (Italian Quality Association) qualification following the CAMPUS-AICQ course / final exam
- 2000, project manager of the pilot project "Accreditation - Evaluation Model" (Quality Program in Level I Training) of the Politecnico di Torino
- 2000, member of the research group "Accreditation of study courses", appointed by MIUR - Observatory for the evaluation of the university system
- 1999-2000, SINAI Development Committee, pilot project for the evaluation of the Faculties of Engineering in Italy
- 1999, member of the research group "Research group - Basic questionnaire to be used for the implementation of a program for the evaluation of teaching by students", appointed by MIUR - Observatory for the evaluation of the university system
- 1998, co-ordinator of the Research Group "Student Opinions" (Research Group for the "Evaluation of teaching by students"), appointed by MIUR

#### **Evaluations on behalf of Agencies and Institutions**

- 2023.05.15-17 (visit) Team Leader of the QUACING-EURACE accreditation of Mechanical Engineering bachelor and master courses, Università Roma La Sapienza
- 2021.10.11-13 (visit) Coordinator of the Expert Panel appointed by the Free University of Bolzano, assessment of the Faculty of Science and Technology – Engineering Area
- 2020.02.24-25 (visit) President of the Commission of Experts for the meta-evaluation of processes related to the quality of SUPSI - basic training



- 2019.01.14-18 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of Link Campus University
- 2018.11.26-29 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the University of Trieste
- 2017.12.11-15 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the University of Naples Federico II
- 2016.12.12-16 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the University of Udine
- 2016.11.7-11 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the Polytechnic University of Marche, Ancona
- 2016.10.24-28 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the IUAV-University Institute of Architecture of Venice
- 2016.06.8-12 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the "Niccolò Cusano" University
- 2015.03.23-27 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the University of Camerino
- 2014.11.24-28 (visit) President of the Commission of Evaluation Experts (CEV-ANVUR) for the accreditation of the University of Perugia
- 2014.10 (visit) Member of the assessment committee, Institutional Accreditation of Tallinn University of Technology (TUT), Estonian Higher Education Quality Agency (EKKA) 2014.03, component "CEV 4" for pre-activation visits, study courses of the CUN 1 areas -2-3-8-9, ANVUR
- 2013.06.3-4-5 Evaluation of the study courses of Mechanical Engineering (CL) and Mechanical Engineering (LM) at the University of Salerno, QUACING- Agency for quality certification and EUR-ACE accreditation of study courses in engineering
- 2009, Yerevan, Armenia, Assessor for "Assessment of the current state of formulation of internal QA standards for Armenian HEI's", Ref. Project funded by OSIAF / Open Society Institution Support Foundation
- 2010.10.22: evaluator for OAQ - Switzerland: team leader, verification of requirement for accreditation process of the BA "Ingénieur-e Designer" de la Haute école spécialisée de la Suisse Occidentale (HES-SO)
- 2008.11.16-18: evaluator for OAQ - Switzerland: team leader, accreditation of the BA course "Ingénieur-e Designer" de la Haute école spécialisée de la Suisse Occidentale (HES-SO)
- 2008.6.5-6: evaluator for OAQ - Switzerland: team leader, accreditation of the BA course "Technology of machines", DTI-Department of Innovative Technologies, SUPSI-Professional University School of Italian Switzerland
- 2008.5.6-7: evaluator for OAQ - Switzerland: member of the 2007/08 Quality Audit group of the "USI - Università della Svizzera Italiana"
- 2006 nov., 2007 feb., Evaluator for OAQ - Switzerland: member of the group for the joint evaluation OAQ-CTI (Commission du Titre D'Ingenieur - France) at the École Polytechnique Fédérale Lausanne
- 2004, evaluator for OAQ - Switzerland: member of the Accreditation team, L.U.de.S. Paradiso (Lugano)
- 2002, external evaluator of the Finnish part for the Leonardo 2 European Project "Expérimentation de l'Evaluation européenne de la Qualité de la formation supérieure pour l'Industrie" of the "European Network for Quality of Higher Engineering Education for Industry" (ENQHEEI)
- 1998, 1999, 2000, external evaluator for CAMPUS, CRUI
- 1997, SECAI evaluator at the Univ. Católica Valparaíso, Chile (Civil-Mechanica and Civil-Industrial Eng.)

#### **International Projects**

- 2010-2013, Partner of the European project TEMPUS - UNIQT00L "Implementing tools and policies for quality work at institutional level"

- 2010-2012, Partenaire et Membre du Comité de Pilotage, European project TEMPUS - GRINSA "Graduate's Insertion and Assessment as tools for Moroccan Higher Education Governance and Management"
- 2008-2010, Grant Holder, TEMPUS - AIRQUAL European project "Development of Qualifications Framework for Cycles of Higher Education in Aircraft Engineering"
- 2007-2009 Europe-Latin America project ALFA - MIRROR, "Development of a reference model for comparison and recognition of engineering programs", EuropeAid Co-operation office, Reference Team co-leader
- 2004-2007: Leader of working group "SIG A4 - Tools for Quality Assurance and Assessment of Engineering Education" of the European Project TREE (Teaching and Research in Engineering in Europe)
- 2001-2003, participant and "Rapporteur" of the European project E4, Activity 2: Quality Assessment and Quality Assurance (higher education),
- 1998-2000 participation in H3E (European project Higher Engineering Education for Europe), Working Group n. 2 "Quality Recognition in Engineering Education"; rapporteur: of the State-of-the-art Report "Quality Assessment and Quality Assurance" (higher education)
- 1995 and 1997, participation in the CRE-Columbus SECAI School for Assessors (Cartagena de Indias)

#### **Seminars, Courses, Meetings, Conferences**

- 2022.4.12-13, UNIVPM Università Politecnica delle Marche, n. 3 training events "Scheda SUA-CdS: making it an effective tool"
- 2021.10.21&27 Univ. Piemonte Orientale UNIUPO: Training meetings on the contents of the "Annual Monitoring Form for Study Courses (SMA – Scheda Monitoraggio Annuale )
- 2020.11.12 (online, Paris, South America), seminar "Aseguramiento de la Calidad", Programa para formación de directivos universitarios, Columbus
- 2019.03.26 Lucca, speech "Nettle as a beneficial plant" at the Accreditation conference: comparing experiences, IMT Scuola Alti Studi Lucca
- 2018.09.24 Salerno, PTA training in the Quality Assurance system, intervention at the III National Organizational Coordination of MdQNext Quality Didactic Managers, UNISA
- 2018.05.3-4 Pisa, 2018.06.23-24 Parma, 2018.07.9-11 Naples, 2018.10.4-5 Pavia, MdQNext, course for TA training: (Re) Design in the quality of Study Programs: rules, documents and tools
- 2018, January 12 & April 11, Univ. di Parma UNIPR: training course for teachers of the University of Parma entitled "AVA 2.0 - CYCLIC REVIEW and SUA-CdS", UNIPR
- 2017.10.2-4, Training activities for teachers and TAs on "Cyclical review of study courses", Ca 'Foscari University, Venice
- 2017.06.8-9, 2017.07.10-11 and 2017.07.18-19, teacher in three "Training Days for system experts", ANVUR, Rome
- 2015.05.26, introductory report "Quality assessment: comparing experiences in Italy and Europe" at the Conference "Quality Paths to Insubria", University of Insubria, Varese
- 2014.12.4-5, presentation "The rationale behind ANVUR on-site visits for periodic accreditation" and participation in the round table "On-site visits" at the ANVUR International Conference "Teaching and Research evaluation in Europe"
- 2014.10.24, presentation "Periodic accreditation: guidelines and judgment criteria" at the ANVUR Conference "In-Training Self-Assessment, Evaluation and Accreditation System", University of Ferrara
- 2013.7.11, participation in the round table "Procedures, evaluation and follow up of the surveys of student opinion" by ANVUR at the University of Padua, intervention "Procedures, evaluation and follow up of the surveys of the opinion of students at the Politecnico of Turin"

- 2013.7.4, presentation "Self-Assessment, Evaluation and Accreditation System" at the ANVUR Conference "Self-Assessment, Evaluation and Accreditation System", University of Verona
- 2013.02.25, presentation "The compilation of the SUA Form and the Review Report - Examples of best practices in the compilation of the SUA Form", at the ANVUR Conference "In-Training Self-Assessment, Evaluation and Accreditation System", at: University of Studies of Modena and Reggio Emilia 2012-2013, presentation "The structure and contents of the SUA sheet and the Review sheet, at the ANVUR Conference" In-Training Self-Assessment, Evaluation and Accreditation System ", at: University of Bari 9.11.2012 , Catholic University of Milan 15.11.2012, University of Palermo 19.11.2012, University of Padua 21.11.2012, University of Trieste 26.11.2012, University of Naples Federico II 24.1.2013, University of Catania 14.2. 2013, University of Modena 25.2.2013, University of Salerno 26.2.2013, University of Florence 14.3.2013,
- 2012, presentation "The critical elements of the University AQ system", at the ANVUR Conference "In-Training Self-Assessment, Evaluation and Accreditation System", at: University of Rome La Sapienza 29.10.2012, University of Bologna 5.11.2012
- 2011.11.10-11, presentation "Evaluation and Accreditation: the European context", Seminar "Evaluation and accreditation practices in the Gelmini reform (L. 240/10), CRUI Foundation, Rome
- 2012.10.26, presentation "University QA Experiences", at the ANVUR Conference "In-Training Self-Assessment, Evaluation and Accreditation System", Politecnico di Torino
- 2011.9.28, Keynote Speech at the "SISMEC" VI National Congress, Ancona
- 2011.09.13, presentation "Quality Assurance and accreditation of study courses" at the Workshop - University teaching: evaluation and accreditation, NV University of Milan Bicocca and CONVUI
- 2010.12.16, Turin, Conference "Internal Quality Assurance of Study Programs - grasping the nettle: four years later", organization, presentation of the contribution "With the contribution of many - POLITO towards quality assurance" 2010.10.19-21, presentation " Development of Qualification Frameworks for Cycles of Higher Education in Aircraft Engineering (AIRQUAL) ", Conference on" International Standards, Accreditation and Certification in Engineering Education & Profession ", MISIS, MOSCA
- 2010.04.20-21, invited presentation "Quality Assurance of education at POLITO: why, for whom, how", Colloque International de l'Instance Nationale d'Évaluation du système d'Éducation et de Formation, Rabat, Maroc
- 2009.1.26, presentation of "Actions for the advancement of the AiQ Project" at the "CODAU Conference" Quality in teaching and research: correlations and tools ", University of the Sacred Heart - Milan
- 2008.10.2, presentation "Quality assurance: a priority of the Bologna Process", THE BOLOGNA PROCESS DEVELOPMENTS AND TRENDS TOWARDS THE EUROPEAN AREA OF HIGHER EDUCATION, University of Turin
- 2008.9.5-6, presentation "The state of art of university assessment in Italy", International conference on "Statistical Modeling for University Evaluation: an International Overview", University of Foggia
- 2008.3.14, invited lecture, Seminar on internal quality assurance "Quality and Quality Assurance of training in Europe and the new Italian teaching system", University of Cagliari
- 2008.2.29, invited lecture "Efficacy of the degree" (with Furio Camillo), ALMA LAUREA conference "University Training and Labor Market Needs", Catania
- 2007.11.29, lecture "Quality assurance in Italy: a general framework", MIP-SUM School "Quality assurance of teaching in universities", Politecnico di Milano
- 2007.11.24, presentation "ESG & current issues in Italy in the field of QA", Conv. Internaz. AVE-PRO "Current trends in the European Quality Assurance and the Situation in Southern Europe", Pontifical Academy of Sciences, Vatican City

- 2007.10.5, invited lecture "" The quality of study courses and their accreditation: methods and experiences of internal assessment of teaching quality in Italian universities ", NV seminar, University of Sassari 2007.7.23-27
- Summer School, Main Lecturer, "Development and Implementation of Internal Quality Assurance Mechanisms in Armenia", State Engineering Univ. of Armenia, Yerevan State Univ., Open Society Institution, July 23-27 2007
- 2007.1.22, presentation "Cogliere l'ortica (*Picking the nettle*) - The perspectives of quality assurance from a European viewpoint", University Conference on teaching, Mediterranean University of Reggio Calabria
- 2006.06.23, Turin, Conference "Internal Quality Assurance of Study Programs - AIQ of the Degree Programs", organization, presentation of the contribution "Effectiveness and sustainability of a model for the AIQ of the Degree Programs (Proceedings in Annex 2)
- 2006.2.7, lecture "Accreditation of study courses", MIP-SUM School "The qualification of University Colleges: objectives and tools", Rome
- 2005.11.4, lecture "Accreditation and certification institutions: aims and characteristics", MIP-SUM School "Services for teaching", Politecnico di Milano
- 2005.10.13, lecture "An international comparison", School "Training, accreditation and certification: methods and experiences", MIP-SUM School "Services for teaching", Politecnico di Milano
- 2005.6.27-28, presentation "Ongoing experience in Italy with the MIUR-CNVSU RdR 1/04 Quality Assurance and Accreditation Protocol (Information Model)", Luxembourg EU Presidency 3rd ENQHEE1 Colloquium
- 2005.3.17, presentation of an invited memoir "Evaluation and Accreditation of University Study Programs" at the international seminar "THE EVALUATION OF UNIVERSITY ACTIVITIES: STRUCTURES AND RESEARCH", Accademia dei Lincei, Rome
- 2005.2.7, presentation "The experimentation of the information model RdR 1/04 MIUR / CNVSU in the University of Bologna: form and meaning, values, requirements", conference on Quality Assurance of University Study Courses and Accreditation: Problems and Perspectives, Alma Mater Studiorum, Bologna
- 2004, principal teacher of the INTERNACIONAL SEMINAR "Validación Institucional y Acreditación Universitaria", Universidad Católica Santo Toribio de Mogrovejo, Chiclayo - Lambayeque, Perú
- 2004.07.14, Training Course "The quality of administrative services" (with Tiziana Cianni), REGIONAL ACCREDITATION of Degree Programs co-financed by the European Social Fund - II directive of the Piedmont Region - GESD Politecnico di Torino
- 2000.9.14, presentation "Evaluation in the university system", Conference "The change of the Italian university: opportunities, risks, prospects", University of Siena
- 1995.05, "La scelta dell'università", invited lecture, "Le scelte adulte dei giovani nella Società che cambia", conv. Circolo Europa Libera, Torino, 1995.05,

## PUBLICATIONS ON QUALITY ASSURANCE, ACCREDITATION, EVALUATION

### Research reports for the “Observatory for the evaluation of the university system” and for the CNVSU - MIUR

“Valutazione della didattica da parte degli studenti” (Evaluation of teaching by students), RdR 1-98 July 1998

*Gruppo di Ricerca MIUR-Osservatorio: Lorenzo Bernardi, Lucia Boncori, **Muzio Gola (Coord.)**, Carlo Magni, Maria Gabriella Ottaviani [link](#)*

" Questionario di base da utilizzare per l'attuazione di un programma per la valutazione della didattica da parte degli studenti " (Basic questionnaire to be used for the implementation of a program for the evaluation of teaching by students) RdR 1-00 January 2000

*Gruppo di Ricerca MIUR-Osservatorio: Bruno Chiandotto, Muzio M. Gola [link](#)*

“Accreditamento dei Corsi di Studio” (“Accreditation of Degree Programs” - proposal for an Information Model for the Quality Management of Level I University Degree Programs) -, RdR 1-01 June 2001

*Gruppo di lavoro MIUR-CNVSU: Pietro Alessandrini, Elio Borgonovi, Muzio Gola, Antonio Padoa Schioppa, Livio Paolillo [link](#)*

“Proposta di un insieme minimo di domande per la valutazione dell’esperienza universitaria da parte degli studenti frequentanti” (Proposal of a minimum set of questions for the evaluation of the university experience by attending students) RdR 9-02 July 2002

*Gruppo di Ricerca MIUR-CNVSU: **Muzio GOLA (coord.)**, Bruno CHIANDOTTO, Luigi FABBRIS, Paolo MASSIMI, Nice TERZI, Renata VIGANO’, Cristiano VIOLANI [link](#)*

“Proposta di un insieme minimo di domande per la valutazione dell’esperienza universitaria da parte degli studenti che concludono gli studi”, (Proposal of a minimum set of questions for the evaluation of the university experience by students who complete their studies) Doc 4-03 April 2003

*Gruppo di Ricerca MIUR-CNVSU: **Muzio GOLA (coord.)**, Bruno CHIANDOTTO, Luigi FABBRIS, Paolo MASSIMI, Nice TERZI, Renata VIGANO’, Cristiano VIOLANI [link](#)*

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*Gruppo di Ricerca MIUR-CNVSU: **Muzio GOLA (coord.)**, Piero ALESSANDRINI, Bruno CHIANDOTTO, Luigi FABBRIS, Paolo MASSIMI, Nice TERZI, Renata VIGANO’, Cristiano VIOLANI [link](#) (it) [link](#) (en)*

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- 2 GOLA M. M., Quality assurance in Engineering Education on a National and European Scale, Chapter 2 in Vol. D – Quality Assessment and Transparency for Enhanced Mobility and Trans-European recognition, E4 Thematic Network, Firenze University Press, 2003, ISBN 9788884531629, pp. 55-99
- 3 GOLA M.M., Quality assurance in higher education. A case study: Helsinki Technical University, Chapter in Orsingher Chiara (Ed.) Assessing Quality in European Higher Education Institutions. Dissemination, Methods and Procedures. Physica-Verlag Heidelberg. 2006, ISBN 9783790816884, pp. 121-132
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- 21 GOLA, M. M. , Premises to Accreditation : A Minimum Set of Accreditation Requirements in Accreditation Models in Higher Education Experiences and Perspectives in ENQA, Workshops Reports 3, European Network for Quality Assurance in Higher Education, Helsinki, 2003, pp.25-31 [link](#)
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- 23 GOLA M. M.: “Valutazione e Accreditamento dei Corsi di Studio Universitari”, Accademia Nazionale dei Lincei, Seminario internazionale LA VALUTAZIONE DELL’ATTIVITÀ UNIVERSITARIA: STRUTTURE E RICERCA, Roma 17 MARZO 2005
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- 27 GOLA M.M., "Quality Assurance of education at POLITO: why, for whom, how", Colloque International : « L'évaluation de la qualité et de l'équité des systèmes d'éducation et de formation : quels enjeux pour la recherche et l'action ? », Instance Nationale d'Évaluation du système d'Éducation et de Formation, Rabat, Maroc, april 20-21 2010; <http://www.csefrs.ma/pdf/Actesducolloque-SymposiumProceedings.pdf>
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- 29 GOLA M.M., "Assicurare la qualità della formazione: perché, per chi, come", Scuola Democratica, n. 5, giugno 2012, ISSN 1129-731X, ISBN 978-88-6250-401-0, pp. 173-178 [link](#)
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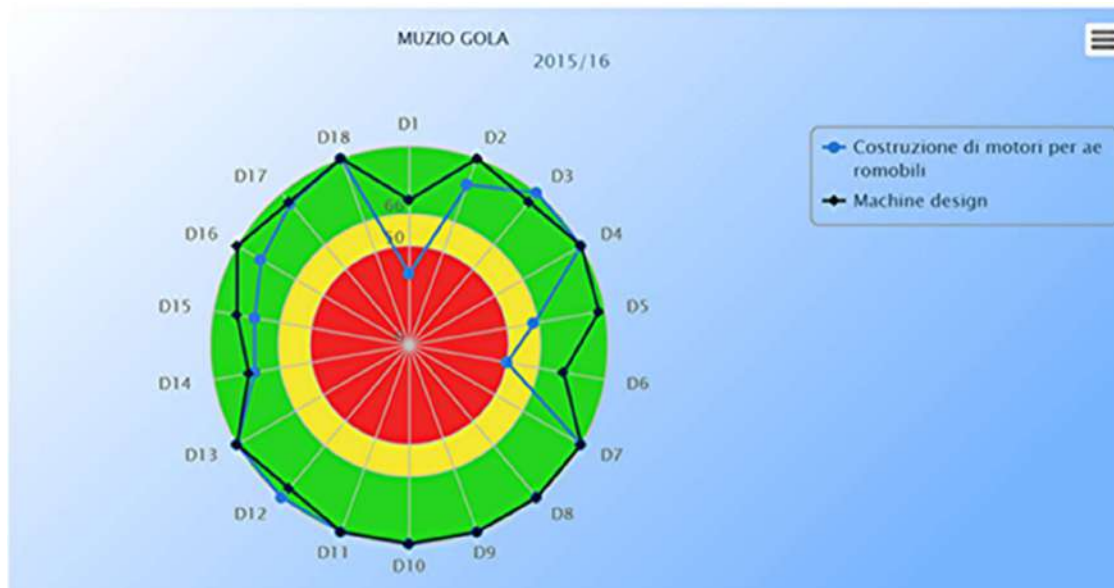
### Organization and teaching in training courses

- Co.In.Fo. Module 1 - Definition and management of quality assurance at university level and of study courses in line with the AVA approach, Permanent School of Administrative Managers of Autonomous Management Centers, Rome 28 November 2019
- MDQNext – In-House courses:
  - Università degli Studi dell'Insubria 24 January 2019,
  - Università degli Studi di Bergamo 14-15 May 2019,
  - Università degli Studi di Firenze 11-12 June 2019
- MDQNext - (Re) Design in the quality of Degree Programs: rules, documents and tools
  - Università degli Studi di Pisa 3 e 4 May 2018,
  - Università degli Studi di Parma 26-26 June 2018,
  - Università degli Studi di Napoli Federico, 10 e 11 July 2018,
  - Università degli Studi di Pavia 4 e 5 October 2018
- Assignments from Universities:
  - 2022.04 - Università Politecnica delle Marche – Teacher and staff training on issues of "Scheda SUA-CdS: farne uno strumento efficace"

- 2021.10.21 & 27, Università del Piemonte Orientale: Staff training on the “Scheda di Monitoraggio Annuale dei Corsi di Studio (SMA)”
- 2018 (12 January, 11 April, 14 December), Università degli Studi di Parma - Teacher and staff training on issues of the Quality Assurance Management System in the Degree Courses of UNIPR
- 2017 Oct.2/4, Università Ca' Foscari – Venezia - Teacher training on Cyclical Review - 2/4 October 2017



## APPENDIX 1 - STUDENT OPINION RADAR DIAGRAM



1. Il carico di studio complessivo degli insegnamenti previsti nel periodo didattico è accettabile?
2. L'orario degli insegnamenti del periodo didattico è ben organizzato?
3. Le regole d'esame, gli obiettivi e il programma dell'insegnamento sono stati resi noti in modo chiaro?
4. L'insegnamento è stato svolto in maniera coerente con quanto dichiarato sul portale della didattica?
5. Le conoscenze preliminari da me possedute sono risultate sufficienti per la comprensione della materia?
6. Il carico di studio richiesto da questo insegnamento è proporzionato ai crediti assegnati?
7. Il materiale didattico, indicato o fornito, è adeguato per lo studio della materia?
8. Le attività didattiche integrative (esercitazioni, laboratori, seminari, visite, ecc.) sono utili per l'apprendimento della materia?
9. Il docente rispetta gli orari di svolgimento dell'attività didattica?
10. Il docente è disponibile a fornire chiarimenti e spiegazioni?
11. Il docente interagisce efficacemente con gli studenti, stimolando l'interesse verso la materia?
12. Il docente espone gli argomenti in modo chiaro?
13. Ritieni che l'azione di coordinamento svolta dal docente titolare del corso sull'attività didattica del collaboratore sia stata efficace?
14. Le aule in cui si svolgono le lezioni sono adeguate?
15. I locali e le attrezzature per le attività didattiche integrative sono adeguati?
16. Sono interessato agli argomenti di questo insegnamento? (Indipendentemente da come è stato svolto)
17. Sono soddisfatto di come è stato svolto questo insegnamento?
18. Al fine dell'apprendimento, la frequenza alle attività didattiche è utile?

1. Is the overall study load of the courses foreseen in the teaching period acceptable?
2. Is the teaching schedule of the teaching period well organized?
3. Are the exam rules, objectives and teaching schedule clearly disclosed?
4. Was the teaching carried out in a manner consistent with what was declared on the teaching portal?
5. Was the preliminary knowledge I possessed sufficient for understanding the subject?
6. Is the study load required by this course proportionate to the credits assigned?
7. Is the teaching material, indicated or provided, adequate for the study of the subject?
8. Are the supplementary educational activities (exercises, workshops, seminars, visits, etc.) useful for learning the subject?
9. Does the teacher respect the teaching hours?
10. Is the teacher available to provide clarifications and explanations?
11. Does the teacher interact effectively with the students, stimulating interest in the subject?
12. Does the teacher explain the arguments clearly?
13. Do you think that the coordination action carried out by the teacher in charge of the course on the collaborator's didactic activity was effective?
14. Are the classrooms in which the lessons take place adequate?
15. Are the premises and equipment for supplementary educational activities adequate?
16. Am I interested in the topics of this teaching? (Regardless of how it was done)
17. Am I satisfied with how this teaching was carried out?
18. For the purpose of learning, is attendance at educational activities useful?

## APPENDIX 2 - STUDENT COMMENTS

CPD - Politecnico di Torino

Commenti espressi dagli studenti

Docente: GOLA MUZIO

ANNO ACCADEMICO: 2015/16

Insegnamento: 03MCHQD - Machine design

(Corso Di Laurea Magistrale In Ingegneria Meccanica (Mechanical Engineering) - Torino)

- Muzio: simply the best!
- Dear Professor for me it was an honor and a privilege to have been your student. I hope for Italy and for universities that professors like you begin to guide the formation of this country and the challenges that stay ahead. However you still have a lot to say to us young engineers. I also wanted to say that your slides are widely used by your pupils; for example, a friend of mine who is currently working at Ferrari (field of transmission), and that was your student, he often uses the slide. The course was almost perfect; I only advise you to deal with the part on the fracture more calmly. Thanks for everything; I wish you all the best. God bless you.
- It is a very nice course, very nicely planned and if executed well by the student, it could help him/her in the professional career. The course information and the materials were very helpful and the references can be very beneficial in case we would like to study the course more comprehensively. Thank you Professor!!
- very good class
- TOO MANY TUTORIALS. YOU CAN NOT IMAGINE HOW MUCH TIME THEY NEED TO BE SOLVED. WE DO NOT HAVE ENOUGH TIME BECAUSE WE HAVE OTHER SUBJECTS IN THE SEMESTER.
- Per quanto riguarda le lezioni del prof. Gola, ho apprezzato molto i numerosi riferimenti alle esperienze professionali. Nel contesto del grigiore generale del Poli la parlantina, le belle cravatte/camicie e, soprattutto, l'umorismo British del prof rendono le lezioni più gradevoli e facili da seguire. D'altro canto avrei preferito che ci fossimo soffermati meno su alcune dimostrazioni lunghe e teoriche per concentrarci su altri aspetti più pratici. Per quanto riguarda le esercitazioni, invece, il problema principale è stato il rapporto numerico docenti/studenti. La sola prof Berruti (che è stata sempre disponibile, trattenendosi a volte anche oltre gli orari limite) doveva rispondere alle domande di una sessantina di studenti. Probabilmente per il prossimo anno sarebbe utile aggiungere degli assistenti/borsisti.
- le slides le trovo troppo confusionarie - il corso è troppo teorico, si dovrebbe snellire un po' il programma , troppi argomenti da ricordare (ma tanto so che questo non sarà fatto, in Italia funziona così).
- I frequenti collegamenti tra teoria e esperienza lavorativa fatti dal Prof. Gola a lezione sono stati molto utili e hanno rappresentato un grosso valore aggiunto. La Prof.ssa Berruti risponde sempre in maniera chiara e completa alle domande fatte durante l'esercitazione. In aula 3D è impossibile leggere alla lavagna a meno che non si è seduti nelle prime file e spesso il microfono non funzionava rendendo difficile l'ascolto della lezione.

CPD - Politecnico di Torino  
Commenti espressi dagli studenti  
Docente: GOLA MUZIO  
ANNO ACCADEMICO: 2015/16  
Insegnamento: 01LKCMT - Costruzione di motori per aeromobili  
(Corso Di Laurea Magistrale In Ingegneria Aerospaziale - Torino)

- Cercherò di evidenziare alcuni punti nel seguito: - Il corso è uno dei più belli e interessanti di tutta la mia carriera accademica. Sicuramente non è leggero ma l'accento sul metodo è quello che serve davvero. Un peccato il non essere riusciti a finire gli argomenti. - Sarebbe interessante affiancare alle esercitazioni (anche in orario extrascolastico) visite, laboratori, e magari qualche simulazione. Con ciò non intendo togliere spazio alla "vecchia scuola" che anzi trovo fondamentale. -Togliere un po' di spazio alle esercitazioni (svolgere gli esercizi in aula non favorisce un buon rendimento, spesso si perde del tempo) in favore delle lezioni\approfondimenti Visto il suo ruolo, anche se forse inappropriato in questa sede, le chiedo: - Perché non inserire un esame di costruzione di macchine anche alla triennale di aerospaziale? - Il questionario ha una valenza importante, ma spesso gli alunni temono la ritorsione del professore durante l'esame - Per assicurarsi il 100% di risposta al questionario perché non obbligare in sede di prenotazione all'esame la compilazione dello stesso ?
- La difficoltà che si nota nel seguire il professore durante le spiegazioni della teoria potrebbe essere alleviata se si rendesse lo studente un po' più partecipe alla lezione (più o meno come è stato fatto per le lezioni sugli ingranaggi); inoltre, nell'unica occasione in cui è capitato di fare prima un'esercitazione su un argomento e solo successivamente assistere alla spiegazione teorica dello stesso, personalmente ho notato come risultasse più semplice riuscire a seguire tale spiegazione: paradossalmente, quindi, forse converrebbe fare sempre in questo modo, perché magari la mente di quello che in futuro sarà un ingegnere riesce a capire meglio alcuni concetti se ne conosce l'applicazione pratica, e questo è tanto più vero quanto più il concetto è ostico e richiede lo sforzo di "immaginare qualcosa chiudendo gli occhi" (come giustamente il professore ci ha spesso consigliato di fare).
- Come lei stesso ha detto, credo che lei sia un "rompiscatole" e all'esame mi sa che saranno dolori. Tuttavia la mia opinione è tutt'altro che negativa, anzi. Di tutti i professori e assistenti che ho avuto (decine e decine e decine), lei è uno dei pochissimi (avanzerebbero le dita di una mano per contarli) che si è preso la briga di mettere a disposizione materiale ben curato nei minimi dettagli sia graficamente, sia nei contenuti. Per questo mille grazie non bastano. Purtroppo, gli argomenti trattati nel suo corso non mi affascinano molto, anzi ad essere onesti, nonostante io capisca perfettamente l'importanza e la criticità di ognuno di loro, un po' mi annoiano (ahimè, de gustibus non disputandum est). Questo tuttavia le fa guadagnare altri punti: nonostante la mia poca passione per tali argomenti, lei li ha saputi rendere piacevoli e ho seguito le sue lezioni praticamente fino alla fine con buon interesse (con un altro probabilmente avrei pensato al suicidio). Per concludere, aggiungo che ho apprezzato molto i cenni storici e gli aneddoti che ha raccontato e soprattutto che il suo modo d' esporre, oltre ad essere chiaro, è semplicemente fantastico. Le auguro di campare almeno altri cent'anni (nonostante la sua autoironia un po' pessimista sull'argomento età ) e di poter continuare ad insegnare ancora a lungo visto che di professori ce ne sono tanti, ma di INSEGNANTI come lei pochissimi.
- Qualità dell'insegnamento ottima ed esposizione dei concetti presentati a lezione chiarissima. Ho apprezzato particolarmente la capacità di trasmettere agli studenti, me compreso, la passione per ciò che si fa, unita ad un modo di esporre gli argomenti a mio parere unico, grazie al quale la lezione diventa una piacevole occasione per apprendere - aspetto non sempre così scontato -. Riesce ad unire grande professionalità a modi piacevolissimi e molto precisi nell'esporre argomenti spesso ostici. Materiale didattico eccellente - difficilmente mi sono imbattuto in materiale così 'maniacalmente' preciso. Se questa può rappresentare un'occasione in cui uno studente 'valuta' un professore: promosso a pieni voti! Di Professori ve ne sono tanti; più raro è incontrare Insegnanti.
- Partendo dal fatto che si tratta più di un corso di laurea a parte che di un esame, per la cura con cui vengono trattati gli argomenti, per la mole di nozioni da imparare e per quella che temo sarà la severità con cui verremo valutati all'esame, devo dire che probabilmente se tutti i corsi fossero oggetto di interesse e di continuo perfezionamento da parte del docente stesso (e il docente avesse le capacità straordinarie che ha Lei), la nostra sarebbe realmente una delle prime università in Europa. Devo dire che però ho notato come sia molto faticoso seguire e capire la teoria senza prima aver fatto le esercitazioni, anche se parrebbe illogico il contrario. Un plauso a Botto, il cui apporto è stato determinante a mio avviso nel farci comprendere cosa stesse dietro la teoria.

**APPENDIX 3 – PROJECTS & FUNDING**

<b>Research in the AERMEC laboratory - altogether over</b>	<b>€ 4 milion euros</b>
<b>Partnerships with aerospace companies</b>	
2013-2014 (AVIO) Prove di usura Nuove Leghe per Z-Notch	€ 11.250,00
2013-2014 (AVIO) Prove di usura T800 per GE90	€ 50.700,00
2013-2014 (Mitsubishi-Hitachi) Research on friction damping and friction model at contact surfaces of turbine blades	€ 38.000,00
2012-2014 (GENERAL ELECTRIC - NUOVO PIGNONE) Estensione dei codici di calcolo per l'analisi dinamica di pale per turbine a vapore (pale HS e stadio di controllo)	€ 46.000,00
2012-2014 (GENERAL ELECTRIC - NUOVO PIGNONE) Prove sperimentali di caratterizzazione usura ai tettucci pale di bassa pressione HS per turbine a vapore	€ 50.000,00
2012-2013 (GENERAL ELECTRIC - NUOVO PIGNONE) Stadio di Controllo – Test statico con due pale e diverse geometrie di smorzatori – Convalida numerico-sperimentale	€ 114.000,00
2011 (GENERAL ELECTRIC - NUOVO PIGNONE) Simulazione analitica di una eccitante magnetica per prove di risposta dinamica su pale di turbina a vapore	€ 10.000,00
2010-2012 (GENERAL ELECTRIC - NUOVO PIGNONE) Indagini numeriche e sperimentali su pale di bassa pressione HS per turbine a vapore	€ 178.000,00
2009-2011 (AVIO) Partnership -Sviluppo di metodologie avanzate per la previsione e la verifica sperimentale del comportamento all'usura di rivestimenti superficiali per applicazioni turbina di nuova generazione	€ 44.000,00
2008-2012 (AVIO) Studio e sviluppo di modelli di calcolo e progetto di sistemi smorzanti ad anello (damper ring) per applicazioni aeronautiche	€ 104.000,00
2009-2011 2009-2011 (AVIO) Partnership -Sviluppo di metodologie avanzate per la previsione e la verifica sperimentale del comportamento all'usura di rivestimenti superficiali per applicazioni turbina di nuova generazione	€ 44.000,00
2007-2010 (AVIO) Prove di fatica a ciclo combinato su provette di cmsx4 all'interno del programma di ricerca europeo Premeccy	€ 60.000,00
2007-2007 (AVIO) Studio di fenomeni dinamici del disco palettato di turbina in presenza di effetti asimmetrici (mistuning) – LAQ AERMEC	€ 50.000,00
2007-2008 (AVIO) Indagine tribologica ad alta temperatura per la valutazione dei parametri di smorzamento e relativo effetto dell'usura per materiali di uso aeronautico	€ 80.000,00
2005-2006 (AVIO) Revisione del progetto degli smorzatori sottopala del primo stadio di turbina lms 100 ipt	€ 50.000,00
2004 (AVIO) Valutazione sperimentale e numerica dello smorzamento dovuto agli smorzatori sotto pala nel primo stadio di turbina lms100 ipt	€ 43.500,00
2001-2004 (AVIO) Studio dell'ottimizzazione del comportamento a fatica e vibrazionale di componenti critici delle turbomacchine	€ 248.000,00
2001 (SKF) Progettazione di dispositivi di taratura e esecuzione di misure diffrattometriche per determinazione dello stato tensionale residuo in anelli di cuscinetti	€ 7.500,00
<b>PRIN (Research Projects of National Interest - Ministerial, Italy)</b>	
2007-2009 Sviluppo e convalida di modelli per il mistuning indotto dagli smorzatori	€ 55.000,00
2002-2004 Determinazione dei parametri di attrito in contatti vibranti per smorzatori passivi di pale di turbine avio: sperimentazione su banchi dedicati, modelli del contatto e degli smorzatori sottopala, convalida numerica della risposta dinamica di sistemi palettati in condizioni controllate di laboratorio	€ 201.000,00
<b>European Community research projects</b>	
2012-2015 UPGRADE (Marie Curie) - complex dynamic interactions of nonlinear, multistage and localization phenomena in turbine engines: development and validation of efficient and accurate modeling techniques	€ 307.000,00
2008-2012 FUTURE Flutter-Free Turbo machinery Blades - European Union 7th FP-UE (AVIO)	€ 158.000,00
2008-2011 DREAM - Validation of radical engine architecture systems	€ 110.000,00
2005-2009 VERDI - Virtual engineering for robust manufacturing with design integration	€ 133.000,00
2005-2009 VITAL - Environmentally friendly aero engine	€ 158.000,00

**Research Projects on Regional and National Funds**

2014-2017, CLUSTER - Greening the propulsion	€ 400.000,00
2012 - ... .. GREAT 2020 - fase 2 - Green engine for air traffic	€ 300.000,00
2009 – 2011 GREAT 2020 - fase 1 - Green engine for air traffic	€ 458.000,00
2007-2010 CORALE - Development of an integrated simulation system for the collaborative design of a low environment impact aeroengine	€ 300.000,00
2005-2007 E10 - Modelli e criteri di progetto per mistuning nelle turbomacchine	€ 65.000,00
<b>Varie</b>	
2015 - ... (Johnson Electric Asti s.r.l.) Reliability analysis methods of PCBA (Printed Circuit Board Assembly) for fan brushless motors	€ 33.000,00
2013-2014 (GATE s.r.l. - Johnson Electric) Metodologie di progettazione e sperimentazione di schede elettroniche di motori elettrici per ventole e sistema ventola convogliatore	€ 56.000,00
2012-2013 (GATE s.r.l. - Johnson Electric) Metodologie di prova e analisi di fatica termica e meccanica per schede elettroniche di controllo di elettroventilatori	€ 25.000,00
2008, (LISA-POLAND) New technologies for sheet metal stamping	€ 3.500,00
2007-2008 (RINALDI) Determinazione dell'abbattimento termico di un riparo calore realizzato in lamiera a più strati	€ 7.000,00
2005-2006 (ALSTOM Ferroviaria) Supporto all'analisi dei risultati dei modelli predittivi di cinetosi e della loro correlazione con le prove sperimentali	€ 60.000,00
2000 (IGNITOR) Progetto del sistema per il riscaldamento a radiofrequenza del plasma nell'intorno delle frequenze di ciclotrone ionico della macchina ignitor	€ 50.000,00

APPENDIX 4 – THE AERMEC LAB.



DIPARTIMENTO DI INGEGNERIA MECCANICA E AEROSPAZIALE  
**GRUPPO DI RICERCA AER-MEC**  
 (AERoMEChanics of turbomachinery)

Progettazione strutturale in campo dinamico di turbomacchine

CHI SIAMO



L'AMBITO DELLA RICERCA

Le turbomacchine per aeromobili    Le turbomacchine per produrre energia



GLI OBIETTIVI

Migliorare il progetto strutturale delle turbomacchine per aumentarne la sicurezza, ridurre i consumi e l'impatto ambientale



I PRINCIPALI PARTNER INDUSTRIALI



I PRINCIPALI PROGETTI



Europei

- H2020 EUROPEAN PROGRAM**
- Clean Aviation – AMBER -innovAtive deMonstrator for hybrid-Electric Regional Application
  - BRAVO - establishing Blend Repair limit of blisks from A perspective of Vibration amplification
  - EXPERTISE – models, Experiments and high PERformance computing for Turbine mechanical Integrity and Structural dynamics in Europe
- FP7 EUROPEAN PROGRAMS**
- FUTURE - Ruffler Free Turbomachinery Blades
  - DREAM - valDation of Radical Engine Architecture systems
- FP6 EUROPEAN PROGRAMS**
- VITAL - EnVironmentALly Friendly Aero Engine
  - VERDI - Virtual engineering for robust manufacturing with design integration



Nazionali

- PNRR - Centro nazionale High Performance Computing
- RAEE/R1-R2- Recupero di materia da RAEE/R1-R2
- CLUSTER GREENING THE PROPULSION
- GREAT 2020 – Green Engine for Air Traffic 2020
- CORALE - Development of an integrated simulation system for the collaborative design of a low environment impact aeroengine

LA NOTTE DEI RICERCATORI 2022

TURIN

