

(Sept. 2017)

Stefano Malvasi

Curriculum vitae

Born in Novara, on 10/10/1967. Master degree in Civil Engineering (1992). After military service worked as Adviser for the Politecnico di Milano Quality System for the SIT (Italian System of Calibration) certification of several University laboratories (pressure, temperature, force and acceleration measurements).

In 1997 awarded Ph.D. in Hydraulics at the Politecnico di Milano. He became Assistant (1999) and Associate (2008) Professor in the Department I.I.A.R – Hydraulic Engineering division of the Politecnico di Milano. Since September 2017 he is full Professor in the Department of Civil and Environmental Engineering of Politecnico di Milano.

INSTITUTIONAL TASKS AT POLITECNICO DI MILANO

Courses:

A.A. 2016/17: “Lifetime analysis and critical working condition of hydraulic devices”, Course of the PhD school of Environmental and Infrastructure Engineering of the Politecnico di Milano.

A.A. 2014/15 –today: Advances in Hydraulics and Fluids Labs, courses of the Master Degree in Civil Engineer and Mathematical Engineer.

A.Y. 2009/10 -2013/14: Advances in Hydraulics and Fluid Mechanics, courses of the Master Degree in Civil Engineer and Mathematical Engineer.

A.Y. 2002/03 – 2009/10: Advances in Hydraulics and Fluid Mechanics, courses of the Master Degree in Civil Engineer and of Bachelor Degree in Mechanical Engineer. Experimental Thermo-fluid-dynamic, integrated course of the Ph.D. School.

A.Y. 1999/00 -A.A. 2001/03: Fluid Mechanics 1 and 2, courses of the Bachelor Degree in Mechanical Engineer.

Other Tasks:

2014 – today, Head of the Hydraulic Laboratory G. Fantoli (L.I.F.) of the Civil and Environmental Engineering Department of the Politecnico di Milano.

A.Y. 2007/08 – today Member of Professor Committee of the Ph.D. school in Hydraulic Engineering and later of the school of Environmental and Infrastructure Engineering of Politecnico di Milano.

A.Y. 2003/04 – today, member of the Committee for the admission to the Master Degree in Civil Engineer.

2005-2012: member of the Scientific Committee of CIRIVE -Interdepartmental Research Centre for the Wind Engineering.

A.Y. 2003/04-2009/10: Secretary of the Civil Engineering Academic Advisory Council.

RESEARCH

The main topics of research are concerned with hydraulics and fluid-dynamics with special focus on the fluid-structure interactions, on the control of mono and multiphase flows and on the energy harvesting in hydraulic devices.

Within the topic of fluid-structure interaction, an image analysis technique, PSV (Particle Strake Velocimetry) derived from the most well-known PIV technique has been developed and used for the experimental characterization of the flow field around fixed and mobile obstacles and for the coupled analysis of flow field and loading on immersed structures. The developed methodology has been applied both in hydraulic and wind tunnels. The experimental results were coupled to CFD numerical models allowing a more complete analysis of the investigated phenomena. In the case of flexible structures, fluid-dynamic and structural numerical simulations were also coupled with co-simulation techniques.

In the field of multi-phase flows, two main problems of pressurized flow, cavitation and slurry flow were addressed.

Cavitation was dealt with within the control process, predictive models for the evaluation of cavitation index were proposed. These methods are based on single-phase CFD modeling coupled with semi-empirical criteria which were experimentally tested and verified on different control devices and operating conditions. Numerical methods have been developed for modeling for slurry flows, both in dense flows conditions, with Eulerian models both for the liquid phase and for the solid phase, and in diluted flows conditions with Eulerian-Lagrangian mixed models. Interesting engineering applications of these models are in the field of pipeline transport and in the forecast of the impact erosion of hydraulic components such as valves, pumps and turbines. Experimental plants dedicated to the study of the impact erosion are design and realized. They are used to characterize different materials (steels with and without coatings and composite materials) and to check the numerical evaluation of the useful lives of specific hydraulic devices.

Fluid-structure interaction studies have also been applied in the field of energy harvesting. Wave energy converter and energy-recovery systems from pressure fluxes are investigated and developed. In particular, a specific WEC system was developed and optimized, while an innovative "GreenValve" system for the recovery of energy that is commonly dissipated in control valves has been developed and patented. The GreenValve system today has two patents, the first of which has recently been licensed.

To the theoretical-experimental approach used at the beginning of the research activity, the numerical CFD was added as auxiliary and integration to the experimental approach with the aim of increase the ability to analyze complex fluid-dynamic phenomena.

The activities described have been developed within the Fluidlab research group (www.fluidlab.polimi.it) and funded through contracts and research projects.

DEPARTMENT RESEARCH CONTRACTS WITH ROLE OF RESPONSALBE OF HYDRAULIC LAB AND SUPERVISOR

2017 "Determination of roughness coefficient of Mapegrout Easy Flow e di Mapelastic" – Mapei S.p.A.

2017 "Control of the separation system for light liquids according to UNI EN 858-1:2005" - BETONCABLO S.p.A.

2017 "Hydraulic model of spillwaygate" - Ministero delle Infrastrutture e dei Trasporti Provveditorato Interregionale alle OO.PP - Lombardia ed Emilia Romagna

2016 "Preliminary analysis of the pipeline failure" – MM S.p.A.

2015 "Head loss characterization of 21 TEE connections" – Raccorderie Metalliche S.p.A.

2015 "Efficiency check of the separation system for light liquids according to UNI EN 858-1:2005" - BETONCABLO S.p.A.

2014 "Sealing tests on a recirculation nozzle for swimming pools" - Unopiscine S.r.l.

DEPARTMENT RESEARCH CONTRACTS WITH SUPERVISOR ROLE

- 2017 "Study and development of the fluid-dynamic design model of calandres" – Zenit S.p.A.
- 2017 "WOsC – Water Oscillator Calculator" - SELVA S.r.l.
- 2017 "Erosion Tests on MMC specimens and bends" – ENI S.p.A.
- 2016 "Experimental analysis of the KW of ball valves" - Tecnovielle S.p.A.
- 2016 "Experimental analysis of the KW of a hydraulic monitoring device" – NextEnergy S.r.l.
- 2016 "Numerical analysis for the design of a Constant Volume Degasser" – Geolog S.r.l
- 2016 "Erosion prediction of XTree in brown fields" – ENI S.p.A.
- 2016 "Experimental characterization of safety valves Ex-d flame arrestor" - MAM S.r.l
- 2015/18 "Analysis and Developing of Control Valves"- PIBIVIESSE Srl.
- 2015 "Hydro-dynamic loads on a river barrier" - ATB Riva Calzoni S.p.A.
- 2014 "Experimental characterization of control changeover for pressurized flow" – FEMA S.r.l.
- 2014 "Experimental characterization of control valves" – Fergat S.r.l.
- 2014 "Flow coefficients in control valves" – MiVal S.r.l.
- 2013 "Arbitrato tra AlpiQ e Ansaldo Energia nel contezioso in corso in merito al corretto funzionamento dell'impianto di estrazione di condensato nella centrale termoelettrica di San Severo" - Ansaldo energia SpA.
- 2013 "Support for the development of cryogenic fluid control devices" – FEMA S.r.l.
- 2012 "Fluid-dynamic modeling of Fast Connectors" – INOXRIVA S.p.A.
- 2012 "Study about the problems occurs to a motorbike brake-system" BREMBO S.p.A.
- 2011 "Performance analysis of Control valves" - PIBIVIESSE S.r.l.
- 2011/14 "Analysis and Developing of Control Valves"- PIBIVIESSE S.r.l.
- 2010 "Fluid-dynamic Forces evaluation on the PIOVRA apparatus"– S.E.I. S.p.A.
- 2010/11 "Single & Multistage Choke Valves"- BREDA ENERGIA S.p.a.
- 2010/11 "Fluid-dynamic analysis of domestic environments" – INDESIT Company S.p.A. e Fondazione Politecnico.
- 2008/09 "Choke Valves"- BREDA ENERGIA SpA.
- 2007/10 "Analysis and Developing of Control Valves"- PIBIVIESSE Srl.
- 2005/07 "Modeling of control valves"- PIBIVIESSE Srl
- 2004 "Image analysis method for the snowdrift measurement"- Club Alpino Italiano
- 2003/04 "Modelling of Cage Ball® control valves"- PIBIVIESSE Srl

LIBERAL CONTRIBUTIONS WITH SUPERVISOR ROLE

- 2017 "Research activities for the studies of methodologies for the energy harvesting from control devices and for their application on water distribution systems" – Premel SA

2014 "Research activities on the theoretical performances of WEC systems" - SELVA S.r.l.

2013 "Partial funding of one year of the research activities on computational fluid dynamics of multiphase flows" – Cham L.t.d.

COMPETITIVE RESEARCH PROJECTS WITH SUPERVISOR ROLE

2010/12 "High Efficient System for the Wave Energy Production" - REGIONE LOMBARDIA, Call 2009 Energy Efficiency.

2005/07 "Flow induced vibration on flexible structures" - PRIN2005 project.

COMPETITIVE RESEARCH PROJECTS

2010/12 "Dynamic response of linear and nonlinear structures: modelling, testing and identification" – PRIN2009 project.

2005/08 "PROMETEO -Civil Protection: Methods and Technology", - Politecnico di Milano Project

2002/04 "Flow Induced vibration on elongated structures" - PRIN2002.

2000/02 "Interaction by Turbulent Flow and Hydraulic Structures" -PRIN2000.

OTHER RESEARCH PROJECTS

1996 "Solutes modeling transportation in rivers, porous-medias and seas"- Supported by Politecnico di Milano University

1996 "Risk Evaluation and Monitoring of Infrastructural and Transportation Systems" - Supported by C.N.R. (National Research Centre)

1995 "2D Flow Field Studies with Laser Velocimetry Techniques" - Supported by LAT-RWTH University, Aachen (Germany)

1994/95 "Scouring erosion around Bridge Piers" – Supported by MURST (Italian Ministero of the Instruction and of the Scientific Research).

CONSULTANT AGREEMENTS

2010 "Fluid dynamic tests of blow-off and control valves"- ANSALDO ENERGIA, work joint with PIVIVIESSE S.r.l.

2010 "Optimization of dosing pumps" - OFFICINE MECCANICHE GALLARATESI S.p.A.

2007 "Hydraulic evaluation of a bridge" - ECOLOGIA AMBIENTE Srl

2002 "Jetting-System for the burying of undersea pipelines" - IDROTEC srl

2000 "Support to the Judge for the criminal proceedings regarding the flooding of 2000 in Trino Vercellese" - COURT OF LOW of VERCELLI

1998 "Flooding flow levels calculation of the Coppa river" - REGIONE LOMBARDIA, work joint with Prof. Silvio Franzetti.

1997 "Fluid-dynamic modeling of a NDE system"- SASIB-BEVERAGE, work joint with Prof. Silvio Franzetti.

1995-1996 "Support for the SIT certification of pressure, temperature, force and acceleration measurements" - POLITECNICO DI MILANO QUALITY CENTRE.

1995 "Development of a software for the automatic calculation of permanent free surface flow profiles" – DIAR, POLITECNICO DI MILANO

JOURNAL PAPERS (LAST 3 YEARS)

1. Mandelli Simone, Muggiasca Sara, Malavasi Stefano (2016). Pressure field and wake modes analysis of an oscillating cylinder. OCEAN ENGINEERING, vol. 124, p. 74-83, ISSN: 0029-8018, doi: 10.1016/j.oceaneng.2016.07.042
2. Messa Gianandrea Vittorio, Malavasi Stefano (2016). The effect of sub-models and parameterizations in the simulation of abrasive jet impingement tests. WEAR, vol. 370-371, p. 59-72, ISSN: 0043-1648, doi: 10.1016/j.wear.2016.10.022
3. Messa Gianandrea Vittorio, Ferrarese Giacomo, Malavasi Stefano (2015). A mixed Euler-Euler/Euler-Lagrange approach to erosion prediction. WEAR, vol. 342-343, p. 138-153, ISSN: 0043-1648, doi: 10.1016/j.wear.2015.08.015
4. S. Malavasi, M.C. Somaschi (2015). Discussion on "Experimental parametric equation for the prediction of valve coefficient (Cv) for choke valve trims". INTERNATIONAL JOURNAL OF PRESSURE VESSELS AND PIPING, vol. 125, p. 1-2, ISSN: 0308-0161, doi: 10.1016/j.ijpvp.2014.08.007
5. G.V. Messa, S. Malavasi (2015). Improvements in the numerical prediction of fully-suspended slurry flow in horizontal pipes. POWDER TECHNOLOGY, vol. 270, p. 358-367, ISSN: 0032-5910, doi: 10.1016/j.powtec.2014.10.027
6. G. Ferrarese, G.V. Messa, M.M. Rossi, S. Malavasi (2015). New method for predicting the incipient cavitation index by means of single-phase computational fluid dynamics model. ADVANCES IN MECHANICAL ENGINEERING, vol. 7, p. 1-11, ISSN: 1687-8132, doi: 10.1177/1687814015575974
7. S. Malavasi, G.V. Messa, U. Fratino, A. Pagano (2015). On cavitation occurrence in perforated plates. FLOW MEASUREMENT AND INSTRUMENTATION, vol. 41, p. 129-139, ISSN: 0955-5986, doi: 10.1016/j.flowmeasinst.2014.11.002
8. L. Fieramonti, E. A. Foglia, S. Malavasi, C. D'Andrea, G. Valentini, F. Cotelli, A. Bassi (2015). Quantitative measurement of blood velocity in zebrafish with optical vector field tomography. JOURNAL OF BIOPHOTONICS, vol. 8, p. 52-59, ISSN: 1864-0648, doi: 10.1002/jbio.201300162
9. G.V. Messa, S. Malavasi (2014). Computational investigation of liquid-solid slurry flow through an expansion in a rectangular duct. JOURNAL OF HYDROLOGY AND HYDROMECHANICS, vol. 62, p. 234-240, ISSN: 0042-790X, doi: 10.2478/johh-2014-0021
10. D. Mirauda, A. Volpe Plantamura, S. Malavasi (2014). Dynamic Response of a Sphere Immersed in a Shallow Water Flow. JOURNAL OF OFFSHORE MECHANICS AND ARCTIC ENGINEERING-TRANSACTIONS OF THE ASME, vol. 136, p. 021101-1-021101-6, ISSN: 0892-7219, doi: 10.1115/1.4026110
11. G.V. Messa, S. Malavasi (2014). Numerical Prediction of Particle Distribution of Solid-Liquid Slurries in Straight Pipes and Bends. ENGINEERING APPLICATIONS OF COMPUTATIONAL FLUID MECHANICS, vol. 8, p. 356-372, ISSN: 1994-2060
12. G. V. Messa, S. Malavasi (2014). Numerical prediction of dispersed turbulent liquid–solid flows in vertical pipes. JOURNAL OF HYDRAULIC RESEARCH, vol. 52, p. 684-692, ISSN: 0022-1686, doi: 10.1080/00221686.2014.939110
13. Gianandrea Vittorio Messa, Michael Malin, Stefano Malavasi (2014). Numerical prediction of fully-suspended slurry flow in horizontal pipes. POWDER TECHNOLOGY, vol. 256, p. 61-70, ISSN: 0032-5910, doi: 10.1016/j.powtec.2014.02.005

CONFERENCE PAPERS (LAST 3 YEARS)

1. Messa Gianandrea Vittorio, Malavasi Stefano (2016). A numerical strategy to account for the effect of self-induced geometry changes in wear estimation. In: Proceedings of the 9th International Conference of Multiphase Flow ICMF2016. p. 1-6, Firenze, 22/5/2016 - 27/5/2016
2. Messa Gianandrea Vittorio, Malavasi Stefano, Scaccabarozzi Diego, Saggin Bortolino, Tarabini Marco, Esposito Francesca, Molfese Cesare (2016). Preliminary design of the inlet duct of a dust analyzer for Mars. In: 3rd IEEE International Workshop on Metrology for Aerospace, MetroAeroSpace 2016 - Proceedings. p. 604-608, Institute of Electrical and Electronics Engineers Inc., ISBN: 9781467382922, ita, 2016, doi: 10.1109/MetroAeroSpace.2016.7573285
3. Messa Gianandrea Vittorio, Ingrosso Irene, Malavasi Stefano (2015). A new methodology for erosion prediction using Eulerian-Eulerian CFD models. In: Proceedings of the ASME 2015 Pressure Vessels and Piping Conference. p. 1-10, ISBN: 978-0-7918-5697-0, Boston, 19/07/2015-23/07/2015, doi: 10.1115/PVP2015-45608
4. Rossi Marco Maria, Messa Gianandrea Vittorio, Ferrarese Giacomo, Malavasi Stefano (2015). Improvements and Validation of the Numerical Prediction of the Incipient Cavitation Index. In: Proceedings of the ASME 2015 Pressure Vessels and Piping Conference. p. 1-9, ISBN: 978-0-7918-5697-0, Boston, 19/07/2015-23/07/2015, doi: 10.1115/PVP2015-45585
5. Malavasi Stefano, Messa Gianandrea Vittorio (2015). New CFD-based method for erosion prediction in control valves. In: Proceedings of Industrial Valve Summit. p. 1-20, Bergamo, 27/05/2015-28/05/2015
6. Malavasi S., Ferrarese G., Rossi M.M. (2014). A control valve for energy harvesting. In: Water Distribution System Analysis Conference - Urban Water Hydroinformatics and Strategic Planning. p. 588-594, Elsevier Ltd, Bari (IT), 14 July 2014 -17 July 2014, doi: 10.1016/j.proeng.2014.11.482
7. F. Bossi, S. Malavasi (2014). Acoustic analysis of a rotary control valve. In: Proceedings of the ASME 2014 Pressure Vessels & Piping Conference . p. 1-9, ISBN: 9780791846018, Anaheim (USA), 20 July 2014 - 24 July 2014, doi: 10.1115/PVP2014-28664
8. S. Malavasi, G.V. Messa (2014). CFD MODELLING OF A CHOKE VALVE UNDER CRITICAL WORKING CONDITIONS. In: Proceedings of the ASME 2014 Pressure Vessels & Piping Division Conference PVP2014. p. 1-9, ISBN: 9780791846018, Anaheim, California, 20/07/2014 - 24/07/2014, doi: 10.1115/PVP2014-28629
9. R. Ardito, F. Perotti, S. Mandelli, D. Novarina, S. Malavasi (2014). Fluid-Structure Interaction and Co-Simulation: Analysis of a Beam-Supported Sphere for VIV Application. In: ASME 2014 Pressure Vessels and Piping Conference - Volume 4: Fluid-Structure Interaction. p. V004T04A066-1-V004T04A066-9, ISBN: 9780791846018, Anaheim, 20-24 luglio 2014, doi: 10.1115/PVP2014-28758

CONFERENCES PRESENTATIONS (LAST 3 YEARS)

1. Rossi Marco Maria, Aiuto Antonio, Barni Danilo, Malavasi Stefano (2016). Experimental and numerical characterization of rotary valve with a high pressure expansion ratio. In: Valve World Conference, 2016.
2. Malavasi Stefano, Messa Gianandrea (2016). Heavy duty behaviour of a cage and sleeve choke valve. In: Valve World Conference, 2016.
3. Messa Gianandrea, Malavasi Stefano (2016). MODELLING OF THE IMPACT WEAR PRODUCED BY DENSE LIQUID-SOLID SLURRIES. In: NACE Milano Italia Section – Conference & Expo 2016 “A European event for the Corrosion Prevention of Oil&Gas industry”.
4. Messa Gianandrea, Malavasi Stefano (2016). Prediction of the impact wear of a valve. In: NACE Milano Italia Section – Conference & Expo 2016 “A European event for the Corrosion Prevention of Oil&Gas industry”. Genova, 29-30 maggio 2016
5. C. Cavaliere, A. Alberello, L. Bennetts, M. Meylan, A. Babanin, S. Malavasi, A. Toffoli (2014). A laboratory experiment assessing the effect of sea ice on wave. In: Proceedings of the European Geosciences Union (EGU). Vienna, 27 April – 02 May

6. M. Negri, S. Malavasi (2014). Analisi sperimentale di un WEC per la zona dei frangenti. In: Atti del XXXIV Convegno Nazionale di Idraulica e Costruzioni Idrauliche. ISBN: 9788890456183, Bari, 8-10 Settembre 2014
7. s. Malavasi, G. Ferrarese, M.M. Rossi (2014). Fluid-Dynamic Characterization of the GreeValve, an Energy Recovery Control Valve. In: Proceedings of the Water Ideas 2014, Intelligent Distribution for Efficient and Affordable Supplies. Bologna, 22-24 October
8. M.V. Mastronardi, G.V. Messa, A. Pagano, S. Malavasi, U. Fratino (2014). Modellazione fluidodinamica del comportamento dissipativo di piatti forati con orifizi a sagomatura variabile. In: Atti del XXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche. p. 491-492, Napoli:Zaccaria Editore, ISBN: 9788890456183, Bari, 07/09/1984-10/09/1984
9. G.V. Messa, S. Malavasi (2014). Simulation of fully-suspended solid-liquid slurry flows in horizontal pipes in parabolic mode. In: Book of Abstract. p. 168-169, DARMSTADT:-, Darmstadt, 30/06/2014 - 02/07/2014

More details: www.fluidlab.polimi.it