



Stefano Malavasi

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. 2018/19: “Management and control design of fluid-dynamic processes” courses of the Master Degree in Civil Engineer.

A.A. 2016/17–today: “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: Fluids Labs, course of the Master Degree in Civil Engineer and Mathematical Engineer.

A.Y. 2009/10 -2017/18: 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:

2018 – 2020, Member of the committee of the National Scientific Habilitation for permanent positions of Full and Associate Professor in Italian Universities (SSD 08/A1).

2014 – 2018, 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 modelling and control of fluid-dynamic processes mono and multiphase flows, on the energy harvesting and the fluid-structure interactions.

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

- 2018 "Supervision of the test procedure for the collection of samples of a separation system for light liquids according to UNI EN 858-1:2005"- Betoncablo S.p.A.
- 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 spillway gate" - 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

- 2019/22 "Analysis and Developing of Control Valves"- PIBIVIESSE Srl.
- 2019 "Analisi del potenziale della rete acquedottistica relativamente al progetto Ctrl M.E." A2A S.p.A
- 2018 "Sviluppo e validazione sperimentale di un sistema di misura di flussi multifase per fanghi di perforazioni petrolifere" – Geolog S.r.l

- 2018 “Modellazione e validazione di un misuratore di portata tipo Venturi per impiego nel campo delle perforazioni petrolifere e produzione di olio e gas da campi petroliferi” – Geolog S.r.l
- 2018 “Water intrusion detection function”- Saipem S.p.A.
- 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 KV of ball valves” - Tecnovielle S.p.A.
- 2016 “Experimental analysis of the KV 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

- 2018 "Studio dello stato dell'arte e impostazione della ricerca sullo studio dell'efficienza di nuove cappe d'aspirazione" - Fondazione Politecnico di Milano.
- 2017 “Study on energy harvesting in free surface flows: River Turbine” - Baronchelli
- 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

- 2019 “Valutazione qualitativa dell’erosione e del fattore di resistenza all’erosione del prodotto Mapefinish rispetto al rivestimento standard” – MAPEI S.p.A.
- 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. Messa, G.V., Wang, Y., Malavasi, S. (2019) A discussion of the test procedures of the API 6AV1 standard based on wear prediction simulations. *Wear* 426-427, pp. 1416-1429. DOI: 10.1016/j.wear.2019.01.042.
2. Boffi, P., Ferrarese, G., Ferrario, M., Malavasi S., Mastronardi, M.V., Mattarei, M. (2019) Coherent optical fiber interferometric sensor for incipient cavitation index detection. *Flow Measurement and Instrumentation* 66, pp. 37-43. DOI: 10.1016/j.flowmeasinst.2018.11.005
3. Messa, G.V., Mandelli, S., Malavasi, S. (2019) Hydro-abrasive erosion in Pelton turbine injectors: A numerical study. *Renewable Energy* 130, pp. 474-488. DOI: 10.1016/j.renene.2018.06.064.
4. Rahimpour, M., Bossi, F.C., Barannyk, O., Malavasi, S., Oshkai, P. (2018) Flow-induced loading on and unsteady flow structure in the wake of bluff perforated plates at zero incidence. *Journal of Fluids and Structures* 81, pp. 712-727. DOI: 10.1016/j.jfluidstructs.2018.06.007.
5. Messa, G.V., Malavasi, S. (2018) A CFD-based method for slurry erosion prediction. *Wear* 398-399, pp. 127-145. DOI: 10.1016/j.wear.2017.11.025.

6. Malavasi, S., Rossi, M.M.A., Ferrarese, G.(2018) GreenValve: hydrodynamics and applications of the control valve for energy harvesting. *Urban Water Journal* 15(3), pp. 200-209. DOI: 10.1080/1573062X.2016.1175483.
7. Messa, G.V., De Lima Branco, R., Filho, J.G.D., Malavasi, S. (2018) A combined CFD-experimental method for abrasive erosion testing of concrete. *Journal of Hydrology and Hydromechanics*. 66(1), pp. 121-128. DOI: 10.1515/johh-2017-0042.
8. Negri, M., Malavasi, S. (2018) Wave Energy Harnessing in Shallow Water through Oscillating Bodies. *Energies* 11(10),2730. DOI: 10.3390/en11102730.
9. Negri, M., Mirauda, D., Malavasi, S. (2018) VIV trajectories of an elastically mounted sphere. *Applied Ocean Research* 70, pp. 62-75. DOI: 10.1016/j.apor.2017.11.006
10. Messa G.V.; Malavasi, S. (2017) 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
11. Bossi F.C.; Barannyk O.; Rahimpour M.; Malavasi S.; Oshkai P. (2017) Effect of transverse perforations on fluid loading on a long, slender plate at zero incidence. *Journal of Hydrology and Hydromechanics* vol.65/4 p.378-384
12. 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

CONFERENCE PAPERS (LAST 3 YEARS)

1. Mirauda, D., Negri, M., Martinelli, L., Malavasi, S.(2018) Influence of boundary conditions on the hydrodynamic forces of an oscillating sphere. *EPJ Web of Conferences* 180,02067
2. Branco, R.L., Fais, L.M.C.F., Matim, A.L.S.S., Malavasi, S., Dalfré Filho, J.G. (2018) The importance of erosion concrete tests for hydraulic surfaces. *7th IAHR International Symposium on Hydraulic Structures, ISHS 2018* pp. 45-54.
3. Malavasi S., Messa G.V., Negri M. (2018). Prediction of Erosion Damage in a Choke Valve Working in Severe Slurry Conditions. *ASME 2018 Pressure Vessels and Piping Conference*. vol. 7, p. 1-10, Prague, Czech Republic, 15/7/2018 - 20/7/2018, doi: 10.1115/PVP2018-84293
4. Fenini L., Malavasi S. (2018) Proceedings of 9th International Symposium on Fluid-Structure Interactions, Flow-Sound Interactions, Flow-Induced Vibration & Noise July 8-11, 2018, Toronto, Ontario, Canada
5. Fecarotta O., Messa G., Pugliese F., Carravetta A., Malavasi S., Giugni M. (2018) Preliminary development of a method for impact erosion prediction in Pumps running As Turbines. *Proceedings 2 (11)*, 680.
6. Messa, G.V., Negri, M., Wang, Y., Malavasi, S. (2017) Estimation of the useful lifetime of a gate valve subjected to impact erosion. *AIMETA 2017 - Proceedings of the 23rd Conference of the Italian Association of Theoretical and Applied Mechanics 2*, pp. 147-163.
7. Carminati M., Stefanelli V., Ferrari G., Sampietro M., Turolla A., Rossi M.M.A., Malavasi S., Antonelli M., Pifferi V., Falcicola L.(2017) Smart pipe: A miniaturized sensor platform for real-time monitoring of drinking water quality. *2017 IEEE Workshop on Environmental, Energy, and Structural Monitoring Systems, EESMS 2017 - Proceedings*
8. 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
9. 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

CONFERENCES PRESENTATIONS (LAST 3 YEARS)

1. Malavasi S., Fenieni L., Papa B. (2018) Integration of Numerical Methods with IEC Standard for Aerodynamic Noise Prediction in Control Devices. Valve World Conference 2018, Dussendorf 27-29 November 2018.
2. Castellini L., Ferrarese G., Malavasi S. (2018) Recover Energy for Smart Grid. International Conference on Energy Engineering and Smart Grids (ESG 2018) Venue: Fitzwilliam College, University of Cambridge, Cambridge city, United Kingdom, 25-26 June, 2018
3. Marchesi E., Negri M., Palo F., Malavasi S., (2018). CFD modeling of a two-oscillating-body wave energy converter in shallow water. XXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche Ancona, 12-14 settembre 2018
4. Bragalli C., Ferrarese G., Malavasi S. (2018). Prospettive di sfruttamento del potenziale energetico di una rete di distribuzione. XXXVI Convegno Nazionale di Idraulica e Costruzioni Idrauliche Ancona, 12-14 settembre 2018.
5. Messa G.V.; Negri M.; Piani L.; Gorini, S.; Malavasi S. (2017). Lifetime prediction of valves subjected to impact erosion. Wear of Materials 2017 - 21st International Conference on Wear of Materials, 26-30 March 2017 / Hilton Long Beach, California, USA
6. Maliardi A., Gorini, S., Malavasi, S., Messa, G.V. (2017). Enhanced erosion prediction for xtree valves' lifetime estimation. Offshore Mediterranean Conference and Exhibition 2017, OMC 2017
7. Messa G.V.; Wang Y.; Piani L.; Malavasi S. (2017) Numerical simulation of impact erosion in liquid-solid abrasive jet impingement tests. 4th ECCOMAS Young Investigator Conference, Milano, 13/9 - 15/9/2017
8. 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.
9. Malavasi Stefano, Messa Gianandrea (2016). Heavy duty behaviour of a cage and sleeve choke valve. In: Valve World Conference, 2016.
10. 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”.
11. 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

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