

MARCO PILOTTI, Ph.D **Full Professor of Hydraulics**

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BIOSKETCH:

Marco Pilotti is Full Professor of Hydraulics at the Università degli Studi of Brescia (Italy), Department of Civil Engineering, Architecture, Land, Environment and Mathematics. In 1989, he graduated cum laude in Civil Environmental Engineering at Politecnico of Milano, where he went on to earn his Research Doctorate in Hydraulic Engineering in 1995. After graduating, he worked in the modelling department of an international oil company where he was involved in several numerical studies of poliphasic flow within porous media and in problems related to the thermodynamic characterization of reservoir fluids. Since 1998, he has taught Hydraulics at the University of Brescia, where he also teaches Environmental Hydraulics. In the period from 2000 to 2003 he also taught Fluid Mechanics at the Faculty of Physics of Università Cattolica del Sacro Cuore in Brescia. He is author of over 100 scientific publications and, among them, he is first author of 20 publications in international refereed journals.

His most important scientific contributions have been in the field of sediment transport and soil erosion (where he proposed a refinement of the Shields' criterion for the inception of sediment motion), in the modelling of flow within porous media at the microscale (that he investigated by numerically reproducing the intergranular space geometry and by numerical solution of Navier Stokes equations), in the field of hydraulic dam safety and of Shallow Water Equations (where he proposed theoretical ways to evaluate dam break waves), with particular attention to the problems of numerical propagation within steep mountain rivers. Over the last 8 years he has focused on the field of physical limnology, and his research group regularly publishes in the most important journals in this field.

In addition to theoretical and numerical activities, he has also conducted several experimental activities, in both the laboratory and the field. He is head of the Hydraulics and Hydrology Laboratory of the Università degli Studi di Brescia and he designed and implemented the field monitoring network for Lake Iseo, made up of 6 stations that measure relevant environmental and hydrodynamic parameters, being a unique example in Italy of a lake monitoring programme completely managed by a University. In July 2010, along with Jorg Imberger, he coordinated a group of 15 researchers from 6 different nations who conducted unprecedented limnological activities on Lake Iseo, with the resulting scholarship published as a set of papers in *Limnology and Oceanography*. Currently he is the leader of the international ISEO (*Improving the lake Status from Eutrophy towards Oligotrophy*) project, whose main objective is the identification and quantitative assessment of the synergic effects on the water quality of local pressures, in the watershed and along the shoreline, and global warming.

He is Associate Editor for the American Society of Civil Engineers Journal of Environmental Engineering. In addition, he frequently serves as a reviewer of several Journals; for example, *Journal of Hydraulic Engineering*, *Journal of Hydraulic Research*, *Water Resources Research*, *Advances in Water Resources*, *Earth Surface Processes and Landforms*, *Proceedings of the National Academy of Sciences of the United States of America (PNAS)*, *Journal of Geophysical Research*, *Journal of Limnology*, *Environmental Fluid Mechanics*, *Estuarine, Coastal and Shelf Science*, etc.

He has an extensive experience as a teacher to master students of Civil Engineering, Environmental Engineering and Mechanical Engineering, to whom he taught Hydraulics, Fluid Mechanics, Groundwater modeling and Environmental Hydraulics. On average he teaches about 130 students of engineering each year. He has also a good experience as PhD students supervisor.

He is a member of the International Association of Hydraulic Research (IAHR) and of The International Society of Limnology (SIL) and of the American Society of Civil Engineers (ASCE)

RESEARCH INTERESTS:

- Open channel flow
- Physical Limnology
- Hydraulic engineering
- Lake hydrodynamic and water quality modeling
- Software development and numerical methods for environmental modeling.

EDUCATION:

- Politecnico di Milano, Ph.D., Hydraulic Engineering, 1995.
- Politecnico di Milano, M.E. cum laude, Environmental Engineering, 1989.

LANGUAGES:

- Italian (native)
- English (fluent)

EMPLOYMENT:

- Università degli Studi di Brescia, Associate Professor, 2000 to present.
- Università degli Studi di Brescia, Assistant Professor, 1995 to 2000.
- AGIP, Reservoir Engineer, 1989 to 1992.

SELECTED REFEREED JOURNAL ARTICLES:

1. Ghirardi, N., Bolpagni, R., Bresciani, M., Valerio, G., **Pilotti**, M., and Giardino C. (2019). Spatiotemporal dynamics of submerged aquatic vegetation in a deep lake from Sentinel-2 data, *Water*, 11, 563; doi:10.3390/w11030563.
2. Milanese L., and **Pilotti** M. (2019). A conceptual model of vehicles vulnerability to floods. Accepted for publication in *Journal of Hydraulic Research*.
3. Valerio, G., **Pilotti**, M., Lau, M.P. and Hupfer, M., (2019). Oxycline oscillations induced by internal waves in deep Lake Iseo, *Hydrol. Earth Syst. Sci.*, 23, 1763-1777, <https://doi.org/10.5194/hess-23-1763-2019>.
4. Barone, L., **Pilotti**, M., Valerio, G., Balistrocchi, M., Milanese, L., Chapra, S. and Nizzoli, D. (2019) Analysis of the residual nutrient load from a combined sewer system in a watershed of a deep Italian lake, *Journal of Hydrology*, 571, 202-213, <https://doi.org/10.1016/j.jhydrol.2019.01.031>
5. **Pilotti**, M. Chapra S. C. and Valerio, G. (2019). Steady-State Distributed Modeling of Dissolved Oxygen in Data-Poor, Sewage Dominated River Systems Using Drainage Networks, *Environmental Modeling and Software*, 111, 153-169, <https://doi.org/10.1016/j.envsoft.2018.08.027>.
6. Milanese L., Pilotti, M., Belleri, A., Marini A., and Fuchs S. (2018) Vulnerability to flash floods: a simplified structural model for masonry buildings. *Water Resources Research*, 54, DOI: <https://doi.org/10.1029/2018WR022577>.
7. Louise C. Bruce, Marieke A. Frassl, George B. Arhonditsis, Gideon Gal, David P. Hamilton, Paul C. Hanson, Amy L. Hetherington, John M. Melack, Jordan S. Read, Karsten Rinke, Anna Rigosi, Dennis Trolle, Luke Winslow, Rita Adrian, Ana I. Ayala, Serghei A. Bocaniov, Bertram Boehrer, Casper Boon, Justin D. Brookes, Thomas Bueche, Brendan D. Busch, Diego Copetti, Alicia Cortes, Elvira de Eyto, J. Alex Elliott, Nicole Gallina, Yael Gilboa, Nicolas Guyennon, Lei Huang, Onur Kerimoglu, John D. Lenters,

- Sally MacIntyre, Vardit Makler-Picka, Chris G. McBride, Santiago Moreira, Deniz Ozkundakci, Marco **Pilotti**, Francisco J. Rueda, James A. Rusaka, Nihar R. Samala, Martin Schmida, Tom Shatwella, Craig Snorthheim, Frederic Soulignac, Giulia Valerio, Leon van der Linden, Mark Vetter, Brigitte Vinçon-Leite, Junbo Wang, Michael Weber, Chaturangi Wickramaratne, R. Iestyn Woolway, Huaxia Yao, Matthew R. Hipsey, A multi-lake comparative analysis of the General Lake Model (GLM): Stress-testing across a global observatory network, April 2018, *Environmental Modelling and Software* 102:274-291, DOI:10.1016/j.envsoft.2017.11.016
8. **Pilotti**, M., Valerio, G., Giardino, C., Bresciani, M., Chapra, S., (2018). Evidence from field measurements and satellite imaging of impact of Earth rotation on Lake Iseo chemistry, *Journal of Great Lakes Research*, 44, 14–25. DOI: <https://doi.org/10.1016/j.jglr.2017.10.005>
 9. Maranzoni, A., **Pilotti**, M., Tomirotti M., (2017). Experimental and numerical analysis of side weir flows in a converging channel, *J. Hydraulic Engrg.*, ASCE, Volume 143, Issue 7, DOI: [http://dx.doi.org/10.1061/\(ASCE\)HY.1943-7900.0001296](http://dx.doi.org/10.1061/(ASCE)HY.1943-7900.0001296).
 10. Milanese, L., **Pilotti**, M., Bacchi, B. (2016), Using web-based observations to identify thresholds of a person's stability in a flow, *Water Resources Research*, 52, DOI: 10.1002/2016WR019182
 11. Cantelli A., Monti, P., Leuzzi, G., Valerio G. and Pilotti, M. (2017), Numerical simulations of mountain winds in an alpine valley. *Wind and Structures*, Vol. 24, No. 6 (2017) 565-578. DOI: <https://doi.org/10.12989/was.2017.24.6.565>
 12. **Pilotti**, M. (2016), Extraction of cross sections from digital elevation model for one-dimensional dam-break wave propagation in mountain valleys, *Water Resources Research*, 51, doi:10.1002/2015WR017017.
 13. Milanese, L., **Pilotti**, M., Clerici A. and Gavrilovic Z. (2015), Application of an improved version of the erosion potential method in alpine areas, *Italian Journal of Engineering Geology and Environment*, VOL. 1, pages 17-30, 2015. DOI: 10.4408/IJEGE.2015-01-0-02
 14. Milanese, L., **Pilotti**, M., Ranzi, R. (2015), A conceptual model of people's vulnerability to flood, *Water Resources Research*, 51, doi:10.1002/2014WR016172.
 15. Valerio, G., **Pilotti**, M., Barontini, S., Leoni, B. (2015), Sensitivity of the multiannual thermal dynamics of a deep pre-alpine lake to climatic change, *Hydrological Processes*, Volume 29, Issue 5, pages 767–779, doi: 10.1002/hyp.10183.
 16. Guyennon N., Valerio, G., Salerno, F., **Pilotti**, M., Tartari, G., Copetti, D. (2014), Internal wave weather heterogeneity in a deep multi-basin subalpine lake resulting from wavelet transform and numerical analysis, *Advances in Water Resources*, doi:10.1016/j.advwatres.2014.06.013.
 17. **Pilotti**, M., Maranzoni, A., Milanese L., Tomirotti M., Valerio G. (2014), Dam-break modeling in alpine valleys, *Journal of Mountain Science* 11(6): 1429-1441, doi: 10.1007/s11629-014-3042-0
 18. **Pilotti**, M., Simoncelli, S., Valerio, G. (2014), Computing the transport time scales of a stratified lake on the basis of Tonolli's model, *J. Limnol.*, 2014; 73(3): 551-561, doi:10.4081/jlimnol.2014.897.
 19. **Pilotti**, M., Simoncelli, S., Valerio, G. (2014), A simple approach to the evaluation of the actual water renewal time of natural stratified lakes, *Water Resources Research*, VOL. 50, Issue 4, pages 2830–2849, doi:10.1002/2013WR014471.
 20. **Pilotti**, M., Valerio, G., Gregorini, L., Milanese L. and Hogg C. (2014), Study of tributary inflows in Lake Iseo with a rotating physical model, *J. Limnol.*, Vol 73, No 1, doi: 10.4081/jlimnol.2014.772.
 21. **Pilotti**, M., Valerio, G., Leoni, B. (2013), Data Set For Hydrodynamic Lake Model Calibration: A Deep Pre-Alpine Case, *Water Resources Research*, VOL. 49, 1–5, doi:10.1002/wrcr.20506.
 22. Barontini, S. Grottole, M., **Pilotti**, M. (2013), Inferring the Hydraulic Properties of a Historical Soil: A Revisiting of Perrault's Experiments, *Procedia Environmental Sciences*, Vol. 19, 590–598, ISSN 1878-0296, doi: 10.1016/j.proenv.2013.06.067.

23. Mazzoleni, M., Bacchi, B., Barontini, S., Di Baldassarre, G., **Pilotti**, M., and Ranzi, R. (2013). Flooding Hazard Mapping in Floodplain Areas Affected by Piping Breaches in the Po River, Italy. *J. Hydrol. Eng.*, 10.1061/(ASCE)HE.1943-5584.0000840.
24. **Pilotti**, M., Tomirotti M., Valerio G. and Milanese L. (2013): Discussion on Experimental investigation of reservoir geometry effect on dam-break flow by A. Feizi Khankandi, A. Tahershamsi And S. Soares-Frazão, *J. Hydraulic Res.* 50(4), 2012, 376–387., *Journal of Hydraulic Research*, 51:2, 220-222
25. Valerio, G., **Pilotti**, M., Marti, C.L., and Imberger J., The structure of basin scale internal waves in a stratified lake in response to lake bathymetry and wind spatial and temporal distribution: Lake Iseo, Italy. *Limnology and Oceanography*, Volume 57, Issue 3, pp. 772-786 (May 2012).
26. **Pilotti**, M., A. Maranzoni, M. Tomirotti and G. Valerio, 1923 gleno dam-break: case study and numerical modelling, *J. Hydraulic Engrg.*, ASCE, Volume 137, 480 (2011).
27. **Pilotti**, M., M. Tomirotti, G. Valerio, and B. Bacchi, Simplified Method for the Characterization of the Hydrograph following a Sudden Partial Dam Break, *J. Hydraulic Engrg.*, ASCE, Volume 136, Issue 10, pp. 693-704 (October 2010).
28. **Pilotti**, M. Viscous flow in three-dimensional Reconstructed Porous Media , *Int. J. Numerical and Analytical Methods in Geomechanics*, 27, 633-649, 2003.
29. **Pilotti**, M., Succi S., and Menduni G., Energy dissipation and permeability in porous media , *Europhysics Letters*, 60 (1) , 72-78, 2002.
30. **Pilotti** M., Menduni G., Beginning of sediment transport of incoherent grains in shallow shear flows, *Journal of Hydraulic Research*, IAHR, 39, 115-124, 2001.
31. **Pilotti** M., Reconstruction of Clastic Porous Media , *Transport in Porous Media*, 41, 3, 359-364, 2000.
32. **Pilotti** M., Generation of Realistic Porous Media by Grains Sedimentation , *Transport in Porous Media*, 33, 257-278, 1998.
33. **Pilotti**, M., Bacchi, B., Distributed Evaluation of the Contribution of Soil Erosion to the Sediment yield from a Watershed, *Earth Surface Processes and Landforms*, 22, 1239-1251, 1997.
34. **Pilotti**, M., Menduni, G. and Castelli E., Monitoring the Inception of Sediment Transport by Image Processing Techniques , *Experiments in Fluids*, 23, 3, 202-208, 1997.
35. **Pilotti** M., Menduni G., Application of Lattice Gas techniques to the Study of Sediment Erosion and transport Caused by Laminar Sheetflow, *Earth Surface Processes and Landforms*, 22, 885-893, 1997.
36. **Pilotti**, M., Gandolfi C., Bischetti G.B. Identification and Analysis of Natural Channel Networks from Digital Elevation Models , *Earth Surface Processes and Landforms*, 21, 1007-1020, 1996.