Academic Curriculum

Tullio Tucciarelli was born in Palermo, in July 1958. He got a master degree in Hydraulic Engineering at the University of Palermo in March 1922 and a second master degree in Geological Sciences in June 1986 at the same University. In December 1986 he got the position of “Researcher” of Hydraulic Engineering at the University of Reggio Calabria. In the same year, he won two scholarships for a one-year support to carry on studies and research in a foreign country: the Fulbright scholarship, for 50 Italian students, and the Rotary Foundation Scholarship, for 4 students of Sicily or Malta island.

Accepted at the Water Resources program of the Princeton University, he moved in the United States from August 1987 to June 1989. From 1989 to 1992 he has been returning each summer in the U.S.A. as visiting student at the University of Vermont under the supervision of Prof. George Pinder. He finally received the Philosophy Doctor Degree in January 1994.

In 1992 he got the position of Associate Professor of Hydraulics at the University of Reggio Calabria. In November 1st, 2001, he moved to the University of Palermo, where he has been in charge of the course of Fluid Mechanics for Mechanical Engineers up to 2012/2013 academic year and where at present he gives the master course of Hydrodynamics for Civil Engineers. In December 2003 he got the position of full professor of Hydraulics at the University of Palermo. From 2004 to 2007 he has been Coordinator of the Doctorate courses in Hydraulic and Environmental Engineer and in the 2004-2005 academic year he has been secretary of the Engineering Faculty. From March 2011 to December 2013 he has been coordinator of the master degree in Civil and Structural Engineer. He has been tutor of 10 doctorate students and four post-doc students.

Research project coordination

1) National projects coordination:

PRIN 2006: Title: Peak flow estimation in natural channels, duration 2 years, cost € 161.500,00. Topic: discharge estimation in natural channels by means of unsteady state data analysis from two different river sections. Local unit number: 3.

PRIN 2008: Title: Integration of hydraulic measurements in rivers for discharge and hydraulic resistance parameter monitoring, duration 2 years, cost € 231.600,00. Topic: integration of direct and indirect measures for optimal discharge estimation. Local unit number: 4.

PRIN 2010/11: Hydroelectric energy by osmosis in coastal areas, duration 3 years, cost € 1.488.547,00. Topic: Environmental impact of the osmotic energy harvesting in fresh-water salt-water mixing area. Local unit number: 9.

2) Local research units coordination:

PRIN 1997: Title (in Italian): Monitoraggio e controllo del trasporto di contaminanti per la salvaguardia e la gestione delle risorse idriche sotterranee, duration 2 years, cost € 50.392,00. Topic: numerical groundwater flow simulation.

PRIN 1999: New technologies for the qualitative and quantitative monitoring, management and control of groundwater systems, duration 2 years, cost € 37.701,00. Topic: optimal monitoring design for model calibration.

PRIN 2000: Evaluation and attenuation of solid transport impact on urban drainage systems and receiving water bodies, duration 2 years, cost € 21.691,00. Topic: solid transport modeling in open channels.

3) Regional projects coordination:

EU funded POR-FESR project 2000-2006: Hazardous floods early warning system, duration 2 years, cost € 124.500,00. Position: scientific coordinator for University of Palermo. Period: 2007-2008. Topic: development of an early-warning system for urban floods with small prediction time.

EU funded POR-FESR project 2007-2013: Hydroenergy, duration 2.5 years, cost € 715.173,67. Position: scientific coordinator for University of Palermo. Period: 2011-2014. Topic: Development of micro-power turbines to be located at the end of conduits for combined energy production and discharge regulation.

EU funded POR-FESR project 2007-2013: Produzione eolica con ridotto impatto ambientale (PERIMA), duration 1.5 years, cost € 498.575,00. Position: scientific coordinator for IEMEST research institute. Period: 2014-2015. Topic: Development of a self-raising telescopic wind tower prototype, with long distance control.

EU funded POR-FESR project 2007-2013: RILTUS, duration 1 years, cost € 100.000,00. Position: participant. Period: 2014-2015. Topic: Construction of an experimental stand for pump and micro-turbine analysis.

He has been also scientific coordinator of an European INTERREG project, of a four-years research project funded by the Calabria Region administration to the Mechanics and Material Department of the Reggio Calabria University, of a one-year research project funded by the "Banco di Sicilia" bank to the Hydraulic Engineer Department of the Palermo University.

Prof. Tucciarelli has been affiliated in 1/2/2009 to the CNR-IRPI (National Institute for Hydrogeological Protection) of Perugia (Italy) by its Director. With the same Institute a research agreement for the analysis of hydrometric data along the Tiber river has been signed. He has been also scientific coordinator along year 2010 of a research agreement between University of Calabria and University of Palermo, named “Indirect peak flow estimation in natural rivers for discharge estimation along the Crati river”.

Prof. Tucciarelli has been consulting for ESA (Agency for agriculture development in Sicily), for the Sicilian Regional Administration, for the University of Palermo and for the University of Reggio Calabria in the field of flood numerical modeling. He is incorporator of a Spin-Off Company named Wecons, aimed to the design of innovative micro-turbine systems.

Research activity

The initial research topics of Prof. Tucciarelli have been numerical modeling of groundwater quantity and quality flow, pipe network and groundwater model calibration, shallow water modeling according to different simplifications. He is also author of several papers and codes in the field of dual urban drainage modeling, of 1D and 2D shallow water modeling, of indirect discharge estimation in rivers by means of unsteady-state water level analysis. More recently he carried on numerical and experimental studies on the design of Cross-flow turbines, as well as on the discharge regulation by means of hydraulic or electronic devices. He has also constructed a laboratory test system for micro-turbine analysis, in the range of 0-15 KW. He has a scientific production of more than 110 papers, among them 49 on ISI journal with high impact factor among hydraulic journals. In 2013 he has been evaluated positively for the role of examiner in the public commission for the habilitation for associate and full professor in the Italian University, in the field of Hydraulics and Hydraulic Constructions. He is author of three national patents and reviewer of several journals: Advances in Water Resources, Journal of Hydrology, Water Resources Research and others.

The 20 most important papers, better detailed in the references, are described in terms of citations and type of journal in the following table, according to SCOPUS data bank:

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| --- | --- | --- | --- | --- |
| Title | Year | Open Source (Yes/Not) | Number of citations | Number of co-authors |
| Cross-Flow Turbine Design For Energy Production And Discharge Regulation | 2014 | N | 0 | 4 |
| Cost-Benefit Analysis for Hydropower Production in Water Distribution Networks by a Pump as Turbine | 2014 | N | 4 | 4 |
| Banki-Michell optimal design by CFD testing and hydrodynamic analysis | 2013 | Y | 13 | 5 |
| MAST-2D diffusive model for flood prediction on domains with triangular Delaunay unstructured meshes | 2011 | N | 14 | 4 |
| Discharge estimation combining flow routing and occasional measurements of velocity | 2011 | Y | 8 | 3 |
| The MAST-FV/FE scheme for the simulation of two-dimensional thermohaline processes in variable density saturated porous media | 2009 | N | 5 | 2 |
| Using unsteady-state water level data to estimate channel roughness and discharge hydrograph | 2009 | N | 14 | 3 |
| MAST solution of advection problems in irrotational flow fields | 2007 | N | 9 | 2 |
| A Marching in Space and Time (MAST) solver of the shallow water equations. Part I: the 1D model | 2007 | N | 8 | 2 |
| A Marching in Space and Time (MAST) solver of the shallow water equations. Part II: the 2D model | 2007 | N | 12 | 3 |
| Dual multilevel urban drainage model | 2005 | N | 13 | 2 |
| An explicit unconditionally stable numerical solution of the advection problem in irrotational flow fields | 2004 | N | 12 | 3 |
| A new algorithm for a robust solution of the fully dynamic De Saint Venant equations | 2003 | N | 7 | 1 |
| Simultaneous zonation and calibration of pipe network parameters | 2003 | N | 4 | 2 |
| The DORA algorithm for network flow models with improved stability and convergence properties | 2001 | N | 16 | 2 |
| Finite-element modeling of floodplain flows | 2000 | N | 30 | 2 |
| Leak analysis in pipeline systems by means of optimal valve regulation | 1999 | N | 59 | 3 |
| 2D Multilevel Model for Flood Wave Propagation in Flood-Affected Areas | 1998 | N | 30 | 3 |
| A methodology to determine optimal transmissivity measurement locations in groundwater quality management models with scarce field information | 1997 | N | 13 | 3 |
| Optimal data acquisition strategies for the calibration of a transport model for groundwater remediation | 1991 | N | 22 | 2 |