

DR. MATTEO CAMPORESE

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QUALIFICATIONS

Italian National Scientific Qualification for Associate Professorship, 2013
Ph.D. Environmental Engineering, University of Padova, Italy, 2006
Professional Engineer Licensure, University of Padova, Italy, 2002
BE/ME ("Laurea V.O.") Environmental Engineering, University of Padova, Italy, 2001

MAJOR RESEARCH INTERESTS

- Integrated surface-subsurface hydrological modelling at the catchment scale;
- Data assimilation for hydrological modelling;
- Use of hydrogeophysical data for inverse modelling in groundwater hydrology;
- Geochemical land subsidence in peatlands drained for agriculture.

ACADEMIC EMPLOYMENT

April 2008 – present	Assistant professor, University of Padova, Department of Civil, Environmental, and Architectural Engineering, Padova, Italy
February 2013 – January 2014	Research fellow, Monash University, Department of Civil Engineering, Clayton, Vic, Australia
November 2007 – March 2008	Research associate, University of Padova, Department of Hydraulic, Maritime, Environmental, and Geotechnical Engineering, Padova, Italy
November - December 2007	Visiting research associate, Institut National de la Recherche Scientifique, Centre Eau, Terre et Environnement (INRS-ETE), University of Quebec, Quebec City, Canada
April – September 2007	Temporary instructor in Water distribution and urban drainage systems, Faculty of Engineering, and Research assistant, Department of Hydraulic, Maritime, Environmental, and Geotechnical Engineering, University of Padova, Padova, Italy
May 2006 – April 2007	Postdoctoral researcher, Institut National de la Recherche Scientifique, Centre Eau, Terre et Environnement (INRS-ETE), University of Quebec, Quebec City, Canada
January 2003 – April 2006	PhD research assistant, University of Padova, Department of Hydraulic, Maritime, Environmental, and Geotechnical Engineering, Padova, Italy

TEACHING

- Groundwater hydrology, Master of Environmental Engineering, University of Padova, Course leader, 2014 - ongoing.
- Hydraulic structures II, Master of Civil Engineering, University of Padova, Co-instructor, 2007 - 2016, Course leader 2017 - ongoing.
- River engineering, Master of Environmental Engineering, University of Padova, Co-instructor, 2007 - ongoing.
- Water distribution and urban drainage systems, Master of Civil Engineering, University of Padova, Course leader, 2007 and 2011 - 2012.
- Hydraulic infrastructure, Master of Civil Engineering, University of Padova, Course leader, 2008 - 2010.
- Environmental hydraulic works, Bachelor of Environmental Engineering, University of Padova, Co-instructor, 2007 - ongoing.

POSTGRADUATE SUPERVISION

PhD students (co-supervised)

- Elena Crestani (2010 - 2013), Tracer test data assimilation for groundwater inverse modelling in heterogeneous aquifers, University of Padova.
- Francesco Zovi (2011 - 2014), Uncertainty analysis of groundwater flow and transport in natural porous media, University of Padova.
- Marco Lora (2012 - 2015), Rainfall-triggered shallow landslides in a large-scale physical model, University of Padova.
- Véronique Bouzagliou (2015 - 2016), Calibration of groundwater parameters through the assimilation of electrical data in contamination studies, INRS-ETE University of Quebec.

Postdoctoral researchers

- Dr. Anna Botto (2016 - ongoing), "A new framework for catchment characterization through hydrological data assimilation and process-based modelling", University of Padova.

COMPETITIVE RESEARCH GRANTS

- University of Padova, "A new framework for catchment characterization through hydrological data assimilation and process-based modelling", € 47,000, 2015-2017, Chief investigator.
- Australian Research Council, Linkage project "Catchment water balance and CO₂ fluxes: A comparison between productive land uses", approximately AU\$ 186,000, 2014-2017, Partner Investigator.
- Italian Ministry of Education, University, and Research "Hydroelectric energy by osmosis in coastal areas", PRIN 2010-2011, € 840,000, 2012-2015, Partner investigator.
- University of Padova, "Identification of hydraulic parameters in sedimentary aquifers at the local and catchment scales", € 40,000, 2011-2013, Partner investigator.
- University of Padova, "Geological, morphological and hydrological processes: monitoring, modelling and impact in the north-eastern Italy (GEO-RISKS), approximately € 1,400,000, 2009-2012, Partner investigator.

- University of Padova, “Interpretation of geophysical measurements by ensemble Kalman filter data assimilation techniques for the assessment of natural heterogeneous aquifer hydraulic parameters at the local scale”, approximately € 60,000, 2009-2011, Chief investigator.
- Italian Ministry of Education, University, and Research, “Subsurface flow and transport: coping with complexity and uncertainty in naturally heterogeneous formations”, approximately € 40,000, 2008-2010, Partner investigator.

CONSULTING ACTIVITIES

- University of Padova, Department of Hydraulic, Maritime, Environmental, and Geotechnical Engineering, “Study C.2.10/IV - Revision of the Venice Lagoon Morphological Plan” (in Italian), commissioned by Corila (Consortium for Coordination of Research Activities Concerning the Venice Lagoon System), Partner investigator;
- University of Padova, Department of Hydraulic, Maritime, Environmental, and Geotechnical Engineering, “Physical modelling study of the spillway, outlet, and stilling basin of the Badana dam (Alessandria, Italy)” (in Italian), commissioned by Mediterranea delle Acque S.p.A., Chief investigator (together with Prof. Paolo Salandin);
- University of Padova, International Centre of Hydrology “Dino Tonini”, “Some considerations about flood control and hydropower use of a new reservoir on the Black Drin River (Albania)”, commissioned by TGK Skavica S.r.l., Partner investigator.

OTHER EMPLOYMENT

January - April 2006	Medingegneria S.r.l. (Padova, Italy), design of river embankments, collaborator.
July - December 2002	Hydrosoil S.r.l. (Padova, Italy), monitoring and designing activities for remediation of contaminated sites, collaborator.
January - May 2002	Breda ing. Mario Progettazione e Consulenza Ambientale (Padova, Italy), Provincial Plan for the Remediation of Contaminated Soils in the Trento Province, Italy, collaborator.

MAIN SKILLS

Computer

Simulation and inversion models	CATHY (CATchment HYdrology), coupled model of surface-subsurface flow; EPANET, hydraulic and water quality modelling of water distribution piping systems; EPA SWMM, dynamic rainfall-runoff simulation model for runoff quantity and quality from primarily urban areas; HEC-RAS, river analysis system developed by the U.S. Army Corps of Engineers; saturated/unsaturated flow in porous media (SAT3D/FLOW3D, finite element codes developed at the University of Padova); transport of non reactive solutes in saturated porous media (particle tracking code developed at the University of Padova); R2, forward/inverse solution for 3D or 2D
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	current flow in a quadrilateral or triangular mesh developed at Lancaster University.
Finite Element Gridding	MeshMaker (ArgusOne).
Data assimilation and optimization	Ensemble Kalman filter, particle filter, genetic algorithms.
Programming Languages	FORTRAN (77/90), Matlab.
Operating Systems	UNIX/Linux, Windows (Microsoft), Mac (Apple).
Other Engineering Software	GSLIB (Geostatistical Software Library), LAPACK: Linear Algebra Package (Fortran 77 Routines).
Graphics	Surfer and Voxler (Golden Software), AutoCAD (AutoDesk), Photoshop (Adobe), PowerPoint (Microsoft), Gimp (GNU Image Manipulation Program).
Geographic information systems	ArcGIS (Esri), MapWindow (Idaho State University Geospatial Software Lab), QGIS (OSGeo).
Word Processors	Latex, Word (Microsoft), OpenOffice (Apache).
Spreadsheets	Excel (Microsoft), Gnumeric (GNOME Office Spreadsheet).

Languages

English (fluent, overall IELTS score = 8), French (basic), Italian (mother tongue).

PROFESSIONAL MEMBERSHIPS

2003 – present	Gruppo Italiano di Idraulica (Italian Group of Hydraulics)
2005 – present	American Geophysical Union (Hydrology section)
2012 – present	European Geosciences Union (Hydrological Sciences section)
2016 – present	Società Italiana di Idrologia (Italian Hydrological Society)

SERVICE TO THE DISCIPLINE

Workshop and Conference Organisation

- Co-Convener of *Model Uncertainties, Parameter Estimation, and Data Assimilation in Surface and Subsurface Hydrology*, European Geosciences Union (EGU) General Assembly, Vienna, Austria, 23 - 28 April 2017.
- Member of the scientific committee of *Computational Methods in Water Resources - CMWR 2016*, University of Toronto, Canada, 20 – 24 June 2016.
- Co-Convener of *Spatial patterns evaluation and process-physics understanding in distributed hydrologic modeling*, European Geosciences Union (EGU) General Assembly, Vienna, Austria, 17 - 22 April 2016.
- Member of the local organizing committee of the *7th International Conference on Porous Media & Annual Meeting*, InterPore, May 18 - 21, 2015, Padova, Italy.
- Convener/Chair of *Advances in Integrated Process-Based Distributed Hydrologic Modeling*, European Geosciences Union (EGU) General Assembly, Vienna, Austria, 12 - 17 April 2015.
- Convener/Chair of *Advances in Representation, Integration, and Coupling of Novel Processes in Hydrologic and Transdisciplinary Models*, American Geophysical Union (AGU) Fall Meeting, San Francisco, USA, 15 - 19 December 2014.

- Convener/Chair of *Advances in Integrated Process-Based Distributed Hydrologic Modeling*, European Geosciences Union (EGU) General Assembly, Vienna, Austria, 27 April – 02 May 2014.

Proposal Reviewer

- Agence Nationale de la Recherche (French National Research Agency)
- Ministero dell'Istruzione, dell'Università e della Ricerca (Italian Ministry of Education, Universities and Research)
- Deutsche Forschungsgemeinschaft (German Research Foundation)

Paper reviewer

- Advances in Water Resources
- Journal of Hydrology
- Water Resources Research
- Hydrology and Earth System Sciences
- Hydrological Processes
- Environmental Modelling & Software
- Hydrogeology Journal
- Water
- Remote Sensing
- Sensors
- Reviews of Geophysics

AWARDS

- Outstanding contribution in reviewing, *Advances in Water Resources*, June 2013 and July 2015.
- Crestani, E., **M. Camporese**, and P. Salandin, Saltwater intrusion in coastal aquifers: laboratory experiment and numerical interpretation, poster award in the session "Management and protection of water bodies and ecosystems", XXXV National Conference on Hydraulics and Hydraulic Engineering, Bologna, Italy, 14-16 September 2016.

INVITED PRESENTATIONS AT CONFERENCES AND SEMINARS

- **Camporese, M.**, and A. Botto, Challenges and issues of data assimilation for Richards equation-based integrated hydrological models (*Minisymposium Lecture*), SIAM Conference on Mathematical and Computational Issues in the Geosciences, September 11 – 14, 2017, Erlangen, Germany.
- **Camporese, M.**, and A. Botto, On the importance of measurement error correlations in data assimilation for integrated hydrological models (*Solicited*), European Geosciences Union General Assembly 2017, Vienna, Austria, 28 April 2017.
- **Camporese, M.**, Groundwater in the box: laboratory experiments @ the University of Padova, *Department of Civil Engineering, Monash University*, Melbourne, Australia, February 2017.
- **Camporese, M.**, Hydrological modeling of small ephemeral catchments with different land uses and impacts of vegetation patterns on their water balance, *Institut National de*

la Recherche Scientifique, Centre Eau Terre Environnement, Québec, Canada, December 2016.

- **Camporese, M.**, Groundwater inverse modeling via assimilation of hydrogeophysical data: from theory to practical applications, *Institute for Bio- and Geosciences, IBG-3: Agrosphere, Forschungszentrum Juelich, Germany, June 2014.*
- **Camporese, M.**, G. Cassiani, R. Deiana, P. Salandin, and A. Binley (2013), Is fully coupled hydrogeophysical inversion really better than uncoupled? A comparison study using ensemble Kalman filter assimilation of ERT-monitored tracer test data (*Invited*), Abstract H44D-02 presented at 2013 Fall Meeting, AGU, San Francisco, Calif., 9-13 Dec.
- **Camporese, M.**, Using EnKF to identify the hydraulic conductivity spatial distribution from ERT time-lapse monitoring of tracer test experiments, *Department of Civil Engineering, Monash University, Melbourne, Australia, October 2012.*
- **Camporese, M.**, An ensemble Kalman filter approach to identify the hydraulic conductivity spatial distribution from ERT time-lapse monitoring of three-dimensional tracer test experiments, *Laboratoire d'Hydrologie et de Géochimie de Strasbourg, Université de Strasbourg, Strasbourg, France, June 2012.*
- Putti M., **Camporese M.**, and D. Pasetto (2010). Ensemble Kalman Filter vs Particle Filter in a Physically Based Coupled Model of Surface-Subsurface Flow (*Invited*), Abstract H23H-02 presented at 2010 Fall Meeting, AGU, San Francisco, Calif., 13-17 Dec.

EXTERNAL REFEREES

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