

## PERSONAL INFORMATION



## Daniele Pedretti

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## PERSONAL STATEMENT

Academic CV

## WORK EXPERIENCE

01/02/2019–Present

**Tenure Track Assistant Professor**

Università degli Studi di Milano (UNIMI), Milan (Italy)

- Teaching activities in hydrogeology
- Research in hydrogeology
- Erasmus coordinator

01/11/2016–31/01/2019

**Research Professor in Hydrogeology**

Geological Survey of Finland (GTK), Espoo (Finland)

- Main responsible for research and competence development in hydrogeology at GTK.
- Participation and coordination of national (IKI VietMAR) and EU (H2020 ENERAG) projects.
- Research activities (hydrogeological modelling).
- Teaching activities at partner universities (graduate/undergraduates).

01/06/2013–31/10/2016

**Post-doctoral Fellow**

University of British Columbia (UBC), Vancouver (Canada)

- Research, Antamina mine (Peru) waste rock project: modelling of flow and reactive transport in heterogeneous reactive sulfide-rich mine-waste unsaturated materials, data management, PhD and MSc student coordination, scientific development, site maintenance.
- Research, Diavik mine (Canada) waste rock project: modelling unsaturated flow and reactive transport heterogeneous sulfide-rich mine waste materials under freezing-thawing conditions.
- Teaching activities, Geological Engineering (MSc, BSc).

01/01/2013–31/05/2013

**Post-doctoral Fellow**

Technical University of Catalonia (UPC Barcelona Tech), Barcelona (Spain)

- Research (stochastic modelling and laboratory experiments on heterogeneous aquifers).
- Research (Managed Aquifer Recharge, FP7 MARSOL project)

01/03/2007–30/09/2008

**Junior Research Fellow**

University of Milan / Sapienza University of Rome, Milan / Rome (Italy)

- Research, PRIN 2005 project (Italian Ministry of University and Research MIUR).
- Design of geostatistical maps, groundwater monitoring activities, numerical modeling, DNAPLs characterization, design and modelling of vertical physical confinement and hydraulic barriers.

## EDUCATION AND TRAINING

- 01/10/2008–21/12/2012 **Doctorate / PhD** EQF level 8

Technical University of Catalonia (UPC Barcelona Tech), Barcelona (Spain)

"Tools and analysis of spatio-temporal dynamics in heterogeneous aquifers: applications to artificial recharge and forced-gradient solute transport"

<https://upcommons.upc.edu/handle/2117/94963>
- 01/09/2004–25/02/2007 **Master's degree (Laurea Magistrale)** EQF level 7

University of Milan, Milan (Italy)

Hydrogeology, Applied geosciences, geotechnics.

Thesis on numerical modelling of groundwater management in semi-arid area nearby Madrid, Spain.

Erasmus traineeship at Complutense university, Madrid, Spain
- 01/09/2001–25/04/2004 **Bachelor's degree (Laurea Triennale)** EQF level 6

University of Milan, Milan (Italy)

Geology, hydrogeology.

Thesis: "Hydrogeological characterization of the Brescia province, Italy"

PERSONAL SKILLS

Mother tongue(s) Italian

Foreign language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C2	C2	C2	C2
TOEFL					
Spanish	C2	C2	C2	C2	C2
French	A2	A2	A2	A2	A2
High School					
German	A1	A1	A1	A1	A1
High School					

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user  
 Common European Framework of Reference for Languages

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## Editorial activities

- Editor-in-chief, “Geofluids” (Wiley-Hindawi, IF 2.69, Clarivate Analytics 2017).
- Associate Editor, “Italian Journal of Groundwater” (“*Acque Sotterranee*”)
- Referee for Nature, Water Resources Research, J. Cont. Hydrology, J. Hydrology, Hydrology J., Advances in Water Resources, Water Research Management, Applied Geochemistry, others.

## Funding

- EU H2020 ENeRAG (“Excellency Network Building for Comprehensive Research and Assessment of Geofluids”) project (GA n° 810980). Funded by European Union – H2020. Amount: 999.000 €. Duration: 3 years (2018-2021). Role: Senior Staff
- VIETMAR (“Managed aquifer recharge for Vietnam”). Funded by Finnish Ministry of Foreign Affairs. Amount: 450.000 €. Duration: 3 years (2017-2020). Role: senior staff.
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- GTK – “Internal funding for hydrogeological development”. Funded by: Geological Survey of Finland. Amount: 100.000 €. Duration: 2 years (2018,2019). Role: Coordinator.

## Other participation to relevant projects

- NSERC Antamina and Diavik projects on waste rock piles. Role: UBC Senior Staff.
- EU H2020 MARSOL project. Role: UPC Junior Staff.

## Honors and awards

- Best poster award, Flowpath 2019, Milan, Italy.

## Seminars and keynote invitations

- Seminar, invited speaker, “Tools and analysis on spatio-temporal dynamics in heterogeneous aquifers”. Univ. Milan, spring 2013.
- “Geofluids”, conference, July 2020, Budapest, Hungary. Keynote speaker.

## Teaching activities

- Instructor, University of Milan, 60hrs course on “Groundwater Modeling”, Master’s degree (6 CFU), 2019 - ongoing.
- Instructor, University of Helsinki, intensive course on “Advanced Hydrogeology – Groundwater contamination”, Undergraduates and master course, 2018.
- Instructor, short course on “Reactive transport modeling”, Univ. Helsinki, August 2017.
- Instructor, University of British Columbia (UBC – Canada), course on “Groundwater contamination”, Undergraduate and Master degree in Geological Engineering, 2014-2015
- Support for teaching, short course on “Groundwater modeling”, Centro in Geotecnologie, Univ. di Siena, Master in Geosciences, 2007-2008 and 2018.

## List of convenership

- EGU - European Geophysical Union, Vienna, Austria (2019), Convener of scientific session “ITS2.7/HS11.71/BG1.37/ERE6.8/GMPV3.6 Geofluids as natural resources or sources of contamination: Research and Innovation (supported by RGFC-IAH and ENERAG)” Co-organized as HS11.71/BG1.37/ERE6.8/GMPV3.6, co-sponsored by RGFC-IAH.
- Nordic Geological Winter Meeting, Copenhagen, Denmark (2018), Convener of scientific session “11.1 Groundwater transport in cold, changing climates: theory, experiments, models”
- EGU - European Geophysical Union, Vienna, Austria (2017), Instructor at short course SC77 “Connectivity in Groundwater Applications”

## PhD theses supervision

- Ongoing: Oulu Mining School, University of Oulu (Finland). Candidate: Raul Mollehuara Canales. Thesis topic: characterization and modeling of mining waste deposits. Expected end: 2021.
- Ongoing: Univ. Padova (Italy). Candidate: Nico Dalla Libera. Thesis topic: “Characterization of arsenic in groundwater in the Venetian Alluvial Plain”. Expected end: 2020.

## Master theses supervision

- Ongoing: UNIMI Master’s degree. Candidate: Giacomo Fabbiano. Thesis topic: groundwater modeling for risk management in a polluted area near Corteolona, Italy.
- Ongoing: UNIMI Master’s degree. Candidate: Giulia Divincenzo. Thesis topic: groundwater modeling for risk management in a polluted area near Brescia, Italy.
- April 2009 – February 2010 UNIMI UNIMI Master’s degree. Candidate: Maria Vitiello. Title: “Groundwater modelling to enhance remediation techniques of a NAPL plume in Italy”

- February 2007 – March 2008 UNIMI Bachelor's degree. Candidate: Matteo Pozzi. Title: "Characterization of a dense non aqueous phase liquids (DNAPLs) contamination by a former chemical facility in Rho (Italy)"
- June 2007 – March 2008 UNIMI UNIMI Master's degree. Candidate Stefania Canali. Title: "Modeling groundwater flow to predict long-term slurry walls performances in a contaminated site in the former chemical facility in Cengio (Italy)"
- February 2007 – March 2008 UNIMI UNIMI Master's degree. Candidate: Alberto Francioli. Title: "Conceptual model of chlorinated solvents migration in the aquifers of the former Rho-Bianchi chemical district in Milan"

## Other university affiliations

- Visiting Research Fellow – Notre Dame University & Colorado School of Mines (USA), Fall 2011.

## Fellowships

- July 2013-October 2016 Post-Doctoral Fellowship, EOAS-UBC
- Dec 2012-June 2013 Post-Doctoral Fellowship at Dept of Geosciences – UPC Barcelona Tech
- September-December 2011 FPU - Spanish Ministry of Education PreDoc travel grant
- September 2010 – December 2012 FPU - Spanish Ministry of Education PreDoc scholarship.
- April 2007–Sept 2008 Junior Research Fellowship Associated, Dipartimento di Scienze dellaTerra(Geology) University of Milan UNIMI (Italy)
- July-September 2010 CSIC (Spanish National Research Council) JAE-PreDoc scholarship.
- September 2005 – July 2006 European Erasmus-Socrates scholarship

## Peer-reviewed indexed journal articles

1. Savolainen J, Pedretti D, Collan M. Incorporating Hydrologic Uncertainty in Industrial Economic Models: Implications of Extreme Rainfall Variability on Metal Mining Investments. *Mine Water Environ* [Internet]. 2019 Mar 11 [cited 2019 Mar 12]; Available from: <https://doi.org/10.1007/s10230-019-00600-w>
2. Pedretti D, Luoma S, Ruskeeniemi T, Backman B. A geologically-based approach to map arsenic risk in crystalline aquifers: Analysis of the Tampere region, Finland. *Geoscience Frontiers* [Internet]. 2019 Feb 19 [cited 2019 Feb 28]; Available from: <http://www.sciencedirect.com/science/article/pii/S1674987119300222>
3. Pedretti D, Irannezhad M. Non-stationary peaks-over-threshold analysis of extreme precipitation events in Finland, 1961-2016. *International Journal of Climatology*. 2019 Feb;39(2):1128–43.
4. Dalla Libera N, Pedretti D, Fabbri P, Tateo F, Mason L. Assessing of arsenic controlling factors in the alluvial aquifer nearby Venice lagoon (NE, Italy). 2019;1.
5. Pedretti D, Bianchi M. Reproducing tailing in breakthrough curves: Are statistical models equally representative and predictive? *Advances in Water Resources*. 2018 Mar;113:236–48.
6. Masetti M, Pettinato S, Nghiem SV, Paloscia S, Pedretti D, Santi E. Combining COSMO-SkyMed satellites data and numerical modeling for the dynamic management of artificial recharge basins. *Journal of Hydrology*. 2018 Dec 1;567:41–50.
7. Blackmore S, Pedretti D, Mayer KU, Smith L, Beckie RD. Evaluation of single- and dual-porosity models for reproducing the release of external and internal tracers from heterogeneous waste-rock piles. *Journal of Contaminant Hydrology*. 2018 Jul;214:65–74.

8. Bianchi M, Pedretti D. An Entrogram-Based Approach to Describe Spatial Heterogeneity With Applications to Solute Transport in Porous Media. *Water Resources Research*. 2018 Jul 1;54(7):4432–48.
9. Pedretti D, Masetti M, Beretta GP. Stochastic analysis of the efficiency of coupled hydraulic-physical barriers to contain solute plumes in highly heterogeneous aquifers. *Journal of Hydrology*. 2017 Oct 1;553(Supplement C):805–15.
10. Pedretti D, Mayer KU, Beckie RD. Stochastic multicomponent reactive transport analysis of low quality drainage release from waste rock piles: Controls of the spatial distribution of acid generating and neutralizing minerals. *Journal of Contaminant Hydrology*. 2017 Jun;201:30–8.
11. Bianchi M, Pedretti D. Geological entropy and solute transport in heterogeneous porous media. *Water Resources Research*. 2017 Jun 1;53(6):4691–708.
12. Pedretti D, Russian A, Sanchez-Vila X, Dentz M. Scale dependence of the hydraulic properties of a fractured aquifer estimated using transfer functions. *Water Resour Res*. 2016 Jul 1;52(7):5008–24.
13. Pedretti D, Molinari A, Fallico C, Guzzi S. Implications of the change in confinement status of a heterogeneous aquifer for scale-dependent dispersion and mass-transfer processes. *Journal of Contaminant Hydrology*. 2016 Oct;193:86–95.
14. Masetti M, Pedretti D, Sorichetta A, Stevenazzi S, Bacci F. Impact of a Storm-Water Infiltration Basin on the Recharge Dynamics in a Highly Permeable Aquifer. *Water Resources Management*. 2016 Jan;30(1):149–65.
15. Lorca ME, Mayer KU, Pedretti D, Smith L, Beckie RD. Spatial and Temporal Fluctuations of Pore-Gas Composition in Sulfidic Mine Waste Rock. *Vadose Zone Journal*. 2016;15(10):0.
16. Pedretti D, Lassin A, Beckie RD. Analysis of the potential impact of capillarity on long-term geochemical processes in sulphidic waste-rock dumps. *Applied Geochemistry*. 2015 Nov;62:75–83.
17. Pedretti D, Beckie RD. Stochastic evaluation of simple pairing approaches to reconstruct incomplete rainfall time series. *Stoch Environ Res Risk Assess*. 2015 Dec 14;1–14.
18. Pedretti D, Beckie RD, Mayer KU. Mixing-controlled uncertainty in long-term predictions of acid rock drainage from heterogeneous waste-rock piles. *AGU Fall Meeting Abstracts*. 2015 Dec 1;53:H53K-02.
19. Molinari A, Pedretti D, Fallico C. Analysis of convergent flow tracer tests in a heterogeneous sandy box with connected gravel channels. *Water Resources Research*. 2015 Jul;51(7):5640–57.
20. Pedretti D, Fernández-García D, Sanchez-Vila X, Bolster D, Benson DA. Apparent directional mass-transfer capacity coefficients in three-dimensional anisotropic heterogeneous aquifers under radial convergent transport. *Water Resour Res*. 2014 Feb 1;50(2):1205–24.
21. Pedretti D, Masetti M, Beretta GP, Vitiello M. A Revised Conceptual Model to Reproduce the Distribution of Chlorinated Solvents in the Rho Aquifer (Italy). *Groundwater Monitoring & Remediation*. 2013;33(3):69–77.
22. Pedretti D, Fiori A. Travel time distributions under convergent radial flow in heterogeneous formations: Insight from the analytical solution of a stratified model. *Advances in Water Resources*. 2013 Oct;60:100–9.
23. Pedretti D, Fernández-García D. An automatic locally-adaptive method to estimate heavily-tailed breakthrough curves from particle distributions. *Advances in Water Resources*. 2013 Sep;59:52–65.

24. Pedretti D, Fernández-Garcia D, Bolster D, Sanchez-Vila X. On the formation of breakthrough curves tailing during convergent flow tracer tests in three-dimensional heterogeneous aquifers. *Water Resources Research*. 2013;49(7):4157–4173.
25. Pedretti D, Barahona-Palomo M, Bolster D, Fernández-Garcia D, Sanchez-Vila X, Tartakovsky DM. Probabilistic analysis of maintenance and operation of artificial recharge ponds. *Advances in Water Resources*. 2012 Feb;36:23–35.
26. Pedretti D, Barahona-Palomo M, Bolster D, Sanchez-Vila X, Fernández-Garcia D. A quick and inexpensive method to quantify spatially variable infiltration capacity for artificial recharge ponds using photographic images. *Journal of Hydrology*. 2012 Apr 2;430–431:118–26.
27. Pedretti D, Masetti M, Marangoni T, Beretta GP. Slurry wall containment performance: monitoring and modeling of unsaturated and saturated flow. *Environmental Monitoring and Assessment*. 2011 Apr 5;184(2):607–24.
28. Pedretti D, Fernández-Garcia D, Sanchez-Vila X, Barahona-Palomo M, Bolster D. Combining physical-based models and satellite images for the spatio-temporal assessment of soil infiltration capacity. *Stoch Environ Res Risk Assess*. 2011 Dec 1;25(8):1065–75.
29. Martínez-Santos P, Pedretti D, Martínez-Alfaro PE, Conde M, Casado M. Modelling the Effects of Groundwater-Based Urban Supply in Low-Permeability Aquifers: Application to the Madrid Aquifer, Spain. *Water Resources Management*. 2010 Dec;24(15):4613–38.
30. Pedretti D, Masetti M, Francioli A. Geostatistical techniques for DNAPL contamination assessment in polluted aquifers. The case of the former “Chimica Bianchi” facility in the Milan-Rho district. *Rendiconti online Soc Geol It*. 2008;2:1–3.

## Conference papers

1. Pedretti D, Bianchi M. On the use of power laws to predict solute transport in highly heterogeneous media without fitting. In 2018 [cited 2019 Feb 28]. p. 10687. Available from: <http://adsabs.harvard.edu/abs/2018EGUGA..2010687P>
2. Pedretti D, Smith L. Numerical simulations of temperature-dependent transport in waste rock piles in permafrost-dominated environments. In 2018.
3. Bianchi M, Pedretti D. Geological entropy and solute transport: when good descriptors of aquifer heterogeneity go right. In: *Geophysical Research Abstracts* [Internet]. 2018 [cited 2019 Feb 28]. p. 16972. Available from: <http://adsabs.harvard.edu/abs/2018EGUGA..2016972B>
4. Pedretti D. Evaluating the assumption of power-law late time scaling of breakthrough curves in highly heterogeneous media. In: *EGU General Assembly Conference Abstracts* [Internet]. 2017 [cited 2017 Jul 14]. p. 5119. Available from: <http://adsabs.harvard.edu/abs/2017EGUGA..19.5119P>
5. Pedretti D, Mayer KU, Beckie RD. Risk Assessment Of Acidic Drainage From Waste Rock Piles Using Stochastic Multicomponent Reactive Transport Modeling. In: *Wolkersdorfer, C; Sartz, L; Sillanpää, M & Häkkinen, A: Mine Water & Circular Economy; Lappeenranta, Finland (Lappeenranta University of Technology)*. 2017. p. 696–703.
6. Bianchi M, Pedretti D. What is geological entropy and why measure it? A parsimonious approach for predicting transport behaviour in heterogeneous aquifers. In 2017 [cited 2017 Nov 7]. p. 1909. Available from: <http://adsabs.harvard.edu/abs/2017EGUGA..19.1909B>

7. Pedretti D, Mayer KU, Beckie RD. Blending as an effective option to reduce the risk of water acidification from waste rock pile: a stochastic analysis. In: XXII International Conference of Computational Methods in Water Resources (CMWR) Toronto, Canada. 2016. p. 67.
8. Masetti M, Pedretti D, Sorichetta A, Stevenazzi S, Bacci F. Recharge of a high permeability aquifer from an infiltration basin. In: SGI-AQUA [Internet]. 2016 [cited 2019 Feb 28]. p. 252–252. Available from: <https://air.unimi.it/handle/2434/576937#.XHf8qYhKiHs>
9. Masetti M, Nghiem SV, Sorichetta A, Stevenazzi S, Santi ES, Pettinato S, et al. Aquifer recharge from infiltration basins in a highly urbanized area: the river Po Plain (Italy). In: AGU Fall Meeting Abstracts [Internet]. 2015 [cited 2019 Feb 28]. p. H13J-1722. Available from: <http://adsabs.harvard.edu/abs/2015AGUFM.H13J1722M>
10. Russian A, Pedretti D, Dentz M, Sanchez-Villa X. Anomalous scaling of transfer functions from precipitation to aquifer discharge in Southern Spain explained using a novel multicontinuum approach. In 2014 [cited 2019 Feb 28]. p. 586. Available from: <http://adsabs.harvard.edu/abs/2014EGUGA..16..586R>
11. Pedretti D, Peterson H, Blackmore S, Javadi M, Lorca Ugalde ME, Laurenzi L, et al. Scaling the hydrological and geochemical processes that control drainage from waste-rock piles: an overview. In 2014 [cited 2019 Feb 28]. p. 9996. Available from: <http://adsabs.harvard.edu/abs/2014EGUGA..16.9996P>
12. Pedretti D, Beckie RD. Reconstructing missing information on precipitation datasets: impact of tails on adopted statistical distributions. In 2014 [cited 2019 Feb 28]. p. 7321. Available from: <http://adsabs.harvard.edu/abs/2014EGUGA..16.7321P>
13. Guzzi S, Molinari A, Fallico C, Pedretti D. Experimental evaluation of connectivity influence on dispersivity under confined and unconfined radial convergent flow conditions. In: Geophysical Research Abstracts. 2014. p. EGU2014-5167.
14. Sanchez-Vila X, Pedretti D, Fernández-García D, Bolster D. Breakthrough curves tailing development during convergent flow tracer tests in 3D heterogeneous aquifers. In 2013 [cited 2019 Feb 28]. p. EGU2013-8128. Available from: <http://adsabs.harvard.edu/abs/2013EGUGA..15.8128S>
15. Pedretti D, Fernandez-Garcia D. Optimal reconstruction of non-symmetric travel time density distributions using a new kernel density estimator. In 2013 [cited 2019 Feb 28]. p. EGU2013-9598. Available from: <http://adsabs.harvard.edu/abs/2013EGUGA..15.9598P>
16. Fernandez-Garcia D, Pedretti D, Sanchez-Vila X, Benson D, Bolster D. What controls apparent field capacity coefficients obtained from convergent flow tracer tests in anisotropic randomly heterogeneous formations? In 2013 [cited 2019 Feb 28]. p. EGU2013-9278. Available from: <http://adsabs.harvard.edu/abs/2013EGUGA..15.9278F>
17. Pedretti D, Fernandez-Garcia D, Bolster D, Sanchez-Vila X, Benson D. Numerical evaluation of apparent transport parameters from forced-gradient tracer tests in statistically anisotropic heterogeneous formations. In 2012 [cited 2019 Feb 28]. p. 601. Available from: <http://adsabs.harvard.edu/abs/2012EGUGA..14..601P>
18. Pedretti D, Fernandez-Garcia D, Sanchez-Vila X, Bolster D. Numerical analysis of anomalous tailing on breakthrough curves during a typical convergent-flow tracer tests. In: Abstract H23B-1358 presented at 2012 Fall Meeting, AGU, San Francisco, Calif, 3-7 Dec. 2012.
19. Pedretti D, Sanchez-Vila X, Fernández-García D, Bolster D, Tartakovsky D, Barahona-Palomo M. Designing, operating and maintaining artificial recharge pond under uncertainty: a probabilistic risk analysis. In: Abstract H13B-1208 presented at 2011 Fall Meeting, AGU, San Francisco, Calif, 5-9 Dec. 2011.



20. Pedretti D, Barahona-Palomo M, Bolster D, Fernández-García D, Sanchez-Vila X. Spatial assessment of infiltration capacity of soils for artificial recharge practices using Google Earth images. In: GeoENV Conference, Ghent University, Ghent (Belgium). 2010.
21. Barahona-Palomo M, Pedretti D, Sanchez-Vila X. Infiltration tests at the Sant Vicenç dels Horts artificial recharge experimental site. In: 2010 EGA, editor. Geophysical Research Abstracts. 2010. (EGU2010-5326; vol. 12).
22. Pedretti D, Masetti M. Monitoring and modelling unsaturated and saturated flow to evaluate performance of slurry of slurry walls in Rho (Italy). In: Estudios en la Zona no Saturada del Suelo Vol IX, O Silva et al. Barcelona, Spain; 2009. p. 9.
23. Beretta GP, Cicconi V, Maione M, Pedretti D, Rolle E, Maffucci M. Analisi di tecniche tradizionali ed innovative per il contenimento di falde contaminate. In Rimini, Italy; 2008.
24. Apuani T, Masetti M, Pedretti D, Conforto A. The infiltration process in a terraced slope; experimental and numerical analysis of hydrogeological and geotechnical aspects. In: ALPTER. 2008. p. 21.