

CURRICULUM VITÆ

Rita Fernandes de Carvalho

Abstract

Rita F. Carvalho is a Professor at the Civil Engineering Department of University of Coimbra, Portugal and a Senior Researcher at MARE - Marine and Environmental Sciences Centre. She has Licenciatura in Civil Engineering, MSc in Hydraulics, PhD in Engineering Sciences, which received an award from Portuguese Association of Hydraulic Resources [APRH] and Aggregation Title in Hydraulics, Hydraulic Resources and Environment. The main activity is related with teaching and research at University of Coimbra.

She is member of International Association of Hydraulic and Environmental Resources since 2009, where she is active in the Committee on Hydraulic Structures (member of leadership team 2013-2019) and in Sustainable Development Goals Working Group (since 2019). She is senior member of National Association of Engineers [OE] since 2014. She is a OpenFOAM[®] user and co-founded the Iberian Group of OpenFOAM[®] technology users.

Scientific activity has been centred in the numerical models based on VoF concept coupled with laboratory measurements and experimental work, looking for fluid mechanics details in the aim of Hydraulic Structures associated either on Urban Drainage or Fluvial and Coastal Engineering. She published more than 130 works in Conferences and Journals being around 45 publications in ISI Web of Knowledge/Web of Science. She has been involved in 15 research projects. She participated in more than 30 scientific meetings, 150 scientific events and was involved in more than 30 scientific and review committees of National and International Congresses. She is also reviewer of several International Journals and has complete more than 90 reviews.

She teaches/taught Hydraulics, Numerical Methods, Urban Water (Water Supply and Drainage) and other skills to graduate students; Hydraulic Structures, Fluvial and Coastal Hydraulics, Computational Modelling and other skills to master students and Advances Laboratory Techniques, and Scientific Methodology in pH'D courses; supervised 4 ph'D and 30 master students as well as 2 researchers and she participated in more than 80 juris.

She also participated on several services rendering for Municipality (Coimbra and Barreiro) and cooperate with LNEC and enterprises such as Saint-Goubain, Coda, EDP, FlowMOD3D and Matereo.

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- <https://www.scopus.com/authid/detail.uri?authorId=23484313300>
- <https://uc-pt.academia.edu/RitaFernandesCarvalho>
- <https://scholar.google.pt/citations?user=kl70ylcAAAAJ&hl=en>
- https://www.researchgate.net/profile/Rita_Carvalho2/publications
- <https://www.mendeley.com/profiles/rita-f-carvalho/>
- <https://www.linkedin.com/pub/rita-fernandes-de-carvalho/21/448/8b3?trk=pub-pbmap>
- <https://www.facebook.com/rita.fernandesdecarvalho>

1. Career summary

Since December 1989, she has held positions in the Hydraulics, Water Resources and Environment area of the Department of Civil Engineering (DEC) of the Faculty of Science and Technology of the University of Coimbra (FCTUC), occupying the following professional categories:

- 1989-1991 Monitor;
- 1991-1994 Trainee Assistant (part of the period was on unpaid leave and JNICT grantee);
- 1994-2002 Assistant;
- 2002-2019 Assistant Professor;
- 2020-Present Assistant Professor with Aggregation Title.

2. Education summary

The main training consists of the completion of secondary education, degree, master's, doctorate and the degree of Aggregation, list as following:

May 2020	Aggregation Title in Civil Engineering, Speciality of Hydraulics, Hydraulic Resources and Environment - University of Coimbra, Unanimously Approved.
Octob. 2002	PH'D in Engineering Sciences, area of Civil Engineering, Speciality of Hydraulics, Hydraulic Resources and Environment, University of Coimbra, "Acções Hidrodinâmicas em Estruturas Hidráulicas: Modelação Computacional do Ressonância Hidráulico", Unanimously Approved with Distinction and Unanimous Praise (maximum classification).
July 1994	Master in Hydraulics and Hydraulic Resources at Department of Civil Engineering - University of Coimbra, "Modelos Matemáticos na Simulação de escoamentos Variáveis em Pressão" (1 st Master in Civil Engineering at University of Coimbra), Unanimously Approved with Very Good (maximum classification)
July 1991	Civil Engineering Degree with 14.3/20 (2 nd best student in 1991, first student and unique to finish in July).
July 1986	Secondary school completion with 15.4/20, enabling civil Engineering entrance (1 st option).

Apart the main education, as she has always shown interest in various subjects and to be up to date, she completed 160 courses main dedicated to hydraulics, software and advanced tools.

3. Scientific activity and Production

The list of publication includes 3 books she edits related to different conferences; 1 international book chapter, she wrote in a monograph; 1 national book chapter (authorship); 3 thesis (authorship); 2 special issue in a WOS journal (edition- 1 complete and 1 undergoing); 30 journal paper and more 14 other publications in WOS (authorship); 3-6 paper in national journals (authorship); 47 other papers and 17 abstracts published in international conference's books or online (authorship); 20 papers and abstracts published in national conference's books or online (authorship); 9 posters (authorship); 15 technical reports and 9 other publications (authorship).

Main Book Editions.

- Carvalho, Rita F. & Pagliara, S., 2015, “Proceedings of the International Workshop on Hydraulic Structures: Data Validation”; Book: ISBN 978-989-20-5792-7 & PDF format- ISBN 978-989-98435-9-2;

Main Book Chapter Authorship.

- Chanson, H., Carvalho, Rita F., 2015, ”4. Hydraulic Jumps” in ”Energy Dissipation in Hydraulic Structures” IAHR Monograph, CRC Press, Taylor & Francis Group, Leiden, The Netherlands, 168 pages, 2015 (ISBN 978-1-138-02755-8);

Thesis Autorship.

- Carvalho, Rita F. (2002) “Acções Hidrodinâmicas em Estruturas Hidráulicas: Modelação Computacional do Ressonância Hidráulica“- Tese de Doutoramento, Departamento de Engenharia Civil, Faculdade de Ciências e Tecnologia da Universidade de Coimbra - May 2002;
- Carvalho, Rita F., “Modelos Matemáticos na Simulação de Escoamentos Variáveis em Pressão”, Tese de Mestrado, Departamento de Engenharia Civil, Faculdade de Ciências e Tecnologia da Universidade de Coimbra - March 1994;
- Carvalho, Rita F., “Etude des Ecoulements dans les Milieux Poreux et Geotextiles par la Methode des Elements Frontières”, Université de Liege, Faculté des sciences appliquées, Institut du Génie Civil - 1990-1991.

Journal Edition.

- Carvalho, R.F., Leandro, J. - Editorial of Special Issue on Flow Studies in Hydraulic Structures: recent advances in experimental and numerical modelling (prefácio em anexo digital, <https://www.sciencedirect.com/journal/journal-of-hydro-environment-research/special-issue/10ZKXMD40LV>);
- Carvalho, R.F. and Corrado, G. - Editorial of Special Issue on Numerical Modeling on Hydraulic Structures Flow Associated with Urban and Environmental Engineering - em curso (https://www.mdpi.com/journal/water/special_issues/Model_Hydraulic_Structures_Flow).

Some ISI Web of knowledge / Web of Sciences Publication Authorship (last 5 years + 3 important).

- Anouar Kaouachi, Rita F. Carvalho, Saâdia Benmamar, Mustapha Gafsi, 2019. Numerical assessment of the inception point in different stepped spillway configurations. *Arabian Journal of Geosciences* (2019) 12:564 <https://doi.org/10.1007/s12517-019-4717-1>;
- J. Leandro, Armin Gander, Md Nazmul Azim, Punit Bhola, Iris Konnerth, Winfried Willems, Rita Fernandes de Carvalho, Markus Disse, 2019. Forecasting upper and lower uncertainty bands of river flood discharges with high predictive skill. *Journal of Hydrology* (2019) 576,749-763. DOI: 10.1016/j.jhydrol.2019.06.052;
- Md Nazmul Azim Beg, Ph.D.; Jorge Leandro, PhD; Punit Kumar Bhola, MSc; Iris Konnerth, MSc; Winfried Willems, PhD; Rita Carvalho, PhD; Markus Disse, PhD. 2019. Discharge Interval Method for Uncertain Flood Forecasts Using a Flood Model Chain: City of Kulmbach, *Journal of Hydroinformatics*, 21 (5): 925–944. IWA Publishing DOI: 10.2166/hydro.2019.131;
- Md Nazmul Azim Beg, Rita F. Carvalho, Jorge Leandro. 2019. Effect of manhole molds and inlet alignment on the hydraulics of circular manhole at changing surcharge, *Urban Water Journal*, DOI: 10.1080/1573062X.2019.1611887;
- Santos, J.A., Pedro, F., Coimbra, M., Figuero, A., Fortes, C.J., Sande, J., Körner, M., Lemos, R., Bornschein, A., Weimper, J., van den Bos, J, Dost, B., Hofland, B., Carvalho, R.F., Alvarelllos, A., Peña, H., Pohl, R., Kerpen, N.B., Reis, MT. 2019. “3-D Scale Model Study of Wave Run-up, Overtopping and Damage in a Rubble-Mound Breakwater Subject to Oblique Extreme Wave Conditions”, special issue of the journal “Defect and Diffusion Forum” ISSN: 1662-9507, Vol. 396, pp 32-41 doi:10.4028/www.scientific.net/DDF.396.32 © 2019 Trans Tech Publications Ltd, Switzerland (Submitted: 2019-03-24, Accepted: 2019-05-29, Online: 2019-08-16);
- Carvalho, R.F.; Lopes, P.; Leandro, J.; David, L.M. 2019. Numerical Research of Flows into Gullies with Different Outlet Locations. *Water* 2019, 11, 794, <https://doi.org/10.3390/w11040794>;
- Tscheikner-Gratl, F. Bellos, V., Schellart, A., Moreno-Rodenas, A., Muthusamyd, M., Langeveld, J., Clemens, F., Benedetti, L., Rico-Ramirez, M.A., Carvalho, R.F., Breuer, L., Shucksmith, J., Heuvelink,

- G., Tait, S. (2019). Recent insights on uncertainties present in integrated catchment water quality modelling, *Water Research*, Volume 150, 1 March 2019, Pages 368-379, doi.org/10.1016/j.watres.2018.11.079;
- Lopes, P., Leandro, J., Carvalho, R.F. (2018). Numerical procedure for free-surface detection using a Volume-of-Fluid model. *Journal of Hydro-environment Research*, 21, p.43-51. doi: 10.1016/j.jher.2018.07.002;
 - Manoranjan Muthusamy, Simon Tait, Alma Schellart, Beg, M.N.A., Carvalho, R.F., João L. M. Pedroso de Lima, 2018 “Improving understanding of the underlying physical process of sediment wash-off from urban road surfaces”, *Journal of Hydrology*, 557, 87–98, DOI10.1016/j.jhydrol.2017.11.047;
 - Beg, M.N.A., Carvalho, R.F., Leandro, J., 2018. Effect of surcharge on gully-manhole flow. *J. Hydro-environment Res.* 19, 224–236. <https://doi.org/10.1016/j.jher.2017.08.003> - <https://www.sciencedirect.com/journal/journal-of-hydro-environment-research/special-issue/10ZKXMD40LV>;
 - Lopes, P., Leandro, J., Carvalho, R.F., 2017. Self-Aeration Modelling Using a Sub-Grid Volume-Of-Fluid Model. *International Journal of Nonlinear Sciences and Numerical Simulation*. DOI 10.1515/ijnsns-2017-0015;
 - Beg, M.N.A., Carvalho, R.F., Tait, S., Brevis, W., Rubinato, M., Schellart, A., Leandro, J., 2018. A comparative study of manhole hydraulics using stereoscopic PIV and different RANS models. *Water Sci. Technol.* 2017(1) 87–98. <https://doi.org/10.2166/wst.2018.089>;
 - Lopes, P., Carvalho, R.F., Leandro, J.. (2017). Numerical and experimental study of the fundamental flow characteristics of a 3D gully box under drainage. *Water Science and Technology*, 75 (9) 2204-2215 doi: 10.2166/wst.2017.071 —Retrieved from <http://wst.iwaponline.com/content/early/2017/02/22/wst.2017.071>;
 - Lopes, P., Leandro, J., Carvalho, R.F., Bung, D. (2017). ”Alternating skimming flow over a stepped spillway” *Environ Fluid Mech*, pp 1-20 doi:10.1007/s10652-016-9484-x;
 - Lopes, P., Tabor, G., Carvalho, R. F., and Leandro, J. (2016). “Explicit calculation of natural aeration using a Volume-of-Fluid model.” *Applied Mathematical Modelling*, Elsevier Inc., 40(17–18), 7504–7515. DOI: 10.1016/j.apm.2016.03.033;

- Lopes, P., Leandro, J., Carvalho, R., Russo, B., and Gómez, M. (2016). "Assessment of the Ability of a Volume of Fluid Model to Reproduce the Efficiency of a Continuous Transverse Gully with Grate." *J. Irrig. Drain Eng.*, 142 (10). [http://dx.doi.org/10.1061/\(ASCE\)IR.1943-4774.0001058](http://dx.doi.org/10.1061/(ASCE)IR.1943-4774.0001058);
- Lopes, P., Leandro, J., Carvalho, R., Páscoa, P., Martins, R. (2015) "Numerical and experimental investigation of a gully under surcharge conditions", *Urban Water Journal* 12 (6) Special Issue: Air-Water Flows in Urban Drainage (<http://dx.doi.org/10.1080/1573062X.2013.831916>);
- Lima, R., Cleveland, Carvalho, R.F.(2015) "Infrared thermography as a heat tracer method for velocity estimation in shallow flows". Published in *Die Bodenkultur: Journal of Land Management, Food and Environment*, Vol XX, 65 (3–4).
- Carvalho, R. F., Martins, R. (2009) – "Stepped spillway with hydraulic jumps: scale and numerical models of a conceptual prototype": *Journal of Hydraulic Engineering*, ASCE, v.135, N°7, p615-619; DOI: 10.1061/(ASCE)HY.1943-7900.0000042; WOS:000267054500008 (http://www.dec.uc.pt/ritalmfc/7_HYENG6146,2009.fdf);
- Carvalho, R. F., Lemos, C. M., Ramos, C. M. (2008) "Numerical computation of the flow in hydraulic jump stilling basins": *Journal of Hydraulic Research*, Vol. 46, No. 6 (2008), pp. 739–752; doi:10.3826/jhr.2008.2726; WOS:000263908200002 ([http://www.dec.uc.pt/ritalmfc/Paper_RC-CL-MR_2008_JHR46\(6\)739-75.pdf](http://www.dec.uc.pt/ritalmfc/Paper_RC-CL-MR_2008_JHR46(6)739-75.pdf));
- Carvalho, R. F., Carmo, J. S. A. (2007) "Landslides into reservoirs and their impacts on banks"; *Env. Fluid Mechanics Journal*,7(6): 481-493; DOI 10.1007/s10652-007-9039-2; WOS:000251224400004 (http://www.dec.uc.pt/ritalmfc/Paper_RC+AC2007.pdf);

4. Coordination and participation in scientific projects

From main International Research projects that she collaborated, she highlights the QUICS - Quantifying Uncertainty in Integrated Catchment Studies, 2014-2018 (FP7-PEOPLE-2013-Marie Curie Initial Training Network (ITN) - Multi Partner - EU financial contribution: EUR 4 058 233,86; Coordination: The University Of Sheffield, United Kingdom; 10 partners and 10 Associate partners), HYDRALAB IV- More than water dealing with the

complex interaction of water with environmental elements, sediment, structures and ice (FP7-INFRASTRUCTURES INFRA-2010-1.1.26 - Research Infrastructures for experimental hydraulic research, 2010 - 2014, EU financial contribution: EUR 8.5 million Coordination: Stichting Deltares) and HYDRALAB+ Adapting to climate change (H2020- INFRAIA- EU.1.4.1.21 - RIA - Research and Innovation action - Integrating and opening existing national and regional research infrastructures of European interest, 2015-2019, EU financial contribution: EUR 979 376,17. Coordination: Stichting Deltares (NL); 24 partners and 9 associated partners (<https://hydralab.eu/>)) and from National, FLOWMODEL3D: Startup for Development of a business model for the creation of CFD consultancy company - Universidade de Coimbra & MATEREO and EDP 2015 “Tua Dam Plunge Pool instrumentation”- LNEC, UC, VACO, InforControl, 93330 EUR (DEC- 3.500 EUR).

5. Scientific Meetings

She uses to participate in IAHR congresses and meetings, namely: HSTC - IAHR, Online, 1 July 2020; SDGWG 38th and HSTC 38th IAHR, Panama, September 2019; HSTC 37th IAHR, Kuala Lumpur, Malasia, August 2017; HSTC 36th IAHR, Haia, The Netherland, June 2015; HSTC 35th IAHR, Chengdu, China, September, 2013; HSTC (IWLHS 2013)-IAHR Aachen, Germany, February 2013; HSTC 4th International symposium on hydraulic structures, Porto, Portugal, February 2012; HSTC 3th IJREWHS - International junior researcher and engineer workshop on hydraulic structures - Edinburgh, Scotland, United Kingdom, May 2010; HSTC 33rd IAHR World Congress, Vancouver, 9 August, 2009; HSTC XVI Hydraulic Congress of Asia-Pacific division / 3rd International symposium on hydraulic structures, Nanjing, China, October, 2008.

Apart from IAHR, she also participated in 10 meeting within QUICS Network, 13 within HYDRALAB Network and more other 10 miscellaneous.

She also promote several agreement, namely Cooperation Agreement Between University of Coimbra and University Mohamed Khider Of Biskra (Algeria) and Students Exchange Agreement Between University of Coimbra and Hohai University, People’s Republic Of China.

6. Intervention in the Scientific Community

The list of reviews carried out at the request of editors of indexed scientific journals comprises 90 items. Plubons platform contains some of the reviews from 2015 up to the moment.

She participated in scientific conferences, namely she organized 4 conferences being part of organization committee, as well as she organised 2 sections (Special Session 5th Europe Congress IAHR, Trento, June 2018, (with Prof. Corrado Gisoni) - Session: HS.7 Experimental Investigation of Sewer Structures Hydraulics: Tools, Techniques and Results and ECWS- 4th International Electronic Conference on Water Sciences (with Prof. Corrado Gisoni) - Sanitary, Storm and Combined Sewers and Related Control Works), she was part of more than 30 scientific committees and revision committees and she served as chairman and had other tasks and had presented her work in conferences, as invited speaker (10) or current (more than 100).

Main Scientific Conference Organization.

- “International Workshop on Hydraulic Structures: Data Validation“ – Organizing Committee president IAHR, MARE, Coimbra, 2015 (<http://www.iwhs2015.dec.uc.pt/>).

7. Transfer of Knowledge

The Transfer of Knowledge comprises relevant projects, technical works in which she was consultant and participated, as well as supervision and appreciation reports she was invited to do, serving, National Engineering Office, Ordem dos Engenheiros, National institutions and Universities as municipal, law-court and several enterprises.

She also promote and coordinate several courses as: GIS 2002; MATLAB - 2003, 2012, 2014; OpenFOAM[®] – 2013, 2015, 2017; and IMAGE PROCESSING - 2015.

8. Pedagogical activity

The list of disciplines she taught in the DEC as regent, co-regent and as participant comprises several items in fundamental and applied hydraulics, numerical methods and tools. Also scientific guidance activities, pedagogical material production and projects, as well as the participation in the community, comprising academic tests and others is in the same areas. She supervised 4 ph'D Thesis Supervisions, 2 researchers, 30 master thesis (4 complete 2 years master and 26 complete 1 year master - Bolonha) Preferable disciplines are Advances Hydraulic Laboratory Techniques (Civil Engineering PH'D coordinator 2012-2020); Coastal and Fluvial Engineering (Civil Engineering-coordinator 2015) ; Hydraulic Structures (Master in Civil Engineering Coordinator 2006/07); Computacional Hydraulics (Master in

Civil Engineering co-coordinator 2004/05). Others disciplines comprise Hydroelectric Projects; Water Supply and Drainage; Hydrology and Hydraulic Resources; Cross competence; Environmental Impacts; General Hydraulics; Applied Hydraulics; Numerical Methods; Laboratory of Hydraulics.

The list of PH'D thesis supervised by her comprise Anouar Kaouachi "Modeling the flow of water on a complex channel geometry type stair treads gently sloping " University of Laghouat – Algeria (ongoing); Nazmul Azim Beg "Uncertainty analysis of hydraulic structures behaviour in water quality and quantity in urban drainage systems ", University of Coimbra, 2019; Mohammed Amin Hafnaoui "Numerical and experimental study of the hydraulic jump in triangular channels", University of Mohamed Khider - Biskra, Algeria 2016 - Supervised numerical model work 2014; and Pedro Lopes "Numerical and experimental study of the free surface behaviour under the effect of turbulence on flood control devices.", University of Coimbra 2013-2016.

Pedagogical Material Produced. A list of 12 notes and sets of slides prepared to be part of references to courses, which content already available on the internet or in classes taught by other colleagues (Advanced Hydraulic Laboratory Techniques; Cross Competences; Numerical Methods; Matlab; OpenFOAM; Research Methods; Environmental Impact; Fluvial and Coastal Hydraulic; Systems of Water Supply and Drainage of Rainwater and Wastewater; Hydraulic Structures; Hydrology; Hydrodynamic.

Pedagogical projects. Considering the importance of Programming and Numerical Methods, she was the promoter of the creation of the DEC Programming Club where she is currently a coordinator, which has been increasingly successful.

Participation in juries. He participated in 81 juries of academic tests, 8 of doctoral candidates, 4 of doctoral thesis projects, 8 of non-integrated masters and 61 of integrated masters (17 as president of jury, 23 as advisor, 15 as principal judge at the University of Coimbra and 6 as the main claimant and external guest).

Management Activities. She was responsible or participated in some tasks related to positions in other universities and community. She supported the promotion of Civil Engineering in schools (Colégio S. João de Brito, Lisbon February, 2014), and in Fairs (Futurália in 2018 - 1 day and 2019 - 2 days), and other miscellaneous tasks, supporting students to organize sessions.