**Mohsen Besharat**

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Telephone: +351 934 667 406 | Nationality: Portuguese

**Education**

**Instituto Superior Técnico, University of Lisbon, Portugal (2016-2020)**

PhD – Civil Engineering and Environmental Hydraulics

FCT[[1]](#footnote-1) / REDAWN[[2]](#footnote-2) funded research titled ‘Damping Effects and System Control due to Hydraulic Transients in Water Pipe Systems: Two-Phase Flows and Compressed Air Energy Storage (CAES) Systems’

**University of Tabriz, Iran (2012-2016)**

PhD – Civil Engineering, Hydraulic Structures

HYLOW[[3]](#footnote-3) funded research titled ‘Experimental Study and Numerical Modelling of Pressurized Two-Phase Transient Flow’

**Shahid Bahonar University of Kerman, Iran (2002-2005)**

MSc – Civil Engineering, Hydraulic Structures

Thesis: ‘Optimum Design of Offshore Platforms Using Wavelet Theory for Approximate Calculations of Dynamic Loads Response’

**Azad University, Mahabad Branch, Iran (1998-2002)**

BSc – Civil Engineering

**Employment**

**Instituto Superior Técnico, University of Lisbon, Portugal (Jul 2016 to present)**

**Researcher**

Duties:

* Researcher in a project funded by FCT and the REDAWN European project
* Experimental research activities in CERIS[[4]](#footnote-4) research centre
* Developing a newly proposed water – energy idea ‘TI-CAES’[[5]](#footnote-5)
* Assisting in educational activities for some modules

**Azad University, Saghez Branch, Iran (Jan 2009 to Sep 2017)**

**Assistant Professor**

Duties:

* Delivered lectures and practical classes to undergraduates on modules:

*Geology, Hydraulics, Fluid Mechanics, Dam Engineering, Hydraulic Structures, Water Treatment, Hydrology, Engineering Mechanics: Dynamics, Hydraulic Laboratory, Urban Infrastructures*

* Delivered lectures and practical classes to postgraduates on modules:

*Soft Computing, Continuum Mechanics, Advanced Engineering Mathematics, Elasticity & Plasticity Theory*

* Supervised more than 100 undergraduate projects and 11 postgraduate students on diverse research projects
* Acted as Head of Technology Incubation Centre supporting several academic start-up ideas
* Acted as a member of the research council
* Acted as Head of Civil Engineering Department
* Established the hydraulic laboratory in the civil engineering department

**Urmia Lake Research Institute (Mar 2015 to Sep 2017)**

**Scientific Member of Urmia Lake Restoration Program**

Member of an international restoration program focusing on Urmia Lake (*a vast hypersaline lake in Iran recognized by UNESCO as a Biosphere Reserve*)

Duties:

* Evaluated more than 10 projects
* Prepared the scientific reports
* Acted as a jury member in the evaluation programs

**Instituto Superior Técnico, University of Lisbon, Portugal (Jun 2013 to Dec 2014)**

**Visiting Researcher**

Duties:

* Experimental and numerical research funded by HYLOW European project
* Studied different flow conditions experimentally
* Performed numerical study using one-dimensional (1D) and computational fluid dynamics (CFD) models
* Assisted the management of laboratory activities

**Mahab Ghodss Consulting Engineering Company, Tehran, Iran (Jul 2006 to Jul 2009)**

**Design Engineer & Head of Technical Office**

Duties:

* Performed analysis and design of:

*water supply systems* (*WSS*)*, water conveyance systems* (*WCS*)*, pipelines* (6 *successful projects*)*, canal related structures* (*more than* 10 *projects*)*,* *Pumping stations* (7 *projects*)

* Head of the technical office of Agh-Chay WSS and WCS project

**Authored books**

* Mohammadi, M.; Besharat, M. 2017. *Hydraulic Structures*. Urmia, Iran: Urmia University Publication. http://cl.urmia.ac.ir/node/818 (in Persian)
* Besharat, M. 2010. *Innovative optimization method for structures with dynamic loads*. Germany: LAMBERT Academic Publishing

**Book chapter**

* Besharat, M.; Ramos, H.M. 2020. "Entrapped air in Drinking Water Systems and thermodynamic aspects, part 1". In *Two-phase Flows in Urban Water Systems*. United States: Environmental & Water Resources Institute (EWRI), American Society of Civil Engineering (ASCE). (in preparation)

https://www.asce.org/templates/membership-communities-committee-detail.aspx?committeeid=000011093803

* Besharat, M.; Ramos, H.M. 2020. "Describing boundary conditions and initial conditions in two-phase flow models for Drinking Water Systems". In *Two-phase Flows in Urban Water Systems*. United States: Environmental & Water Resources Institute (EWRI), American Society of Civil Engineering (ASCE). (in preparation)

https://www.asce.org/templates/membership-communities-committee-detail.aspx?committeeid=000011093803

**Selected peer-reviewed journal articles**

* **Besharat, M.,** Tarinejad, R. & Ramos, H.M. 2016. The effect of water hammer on a confined air pocket towards flow energy storage system. *Journal of Water Supply: Research and Technology-AQUA*, *IWA* 65 (2), 116-126.
* **Besharat, M.,** Tarinejad, R., Aalami, M.T. & Ramos H.M. 2016. Study of a compressed air vessel for controlling the pressure surge in water networks: CFD and experimental analysis. *Water Resources Management* 30(8), 2687–2702.
* **Besharat, M.,** Viseu, M.T. & Ramos, H.M. 2017. Experimental study of air vessel behavior for energy storage or system protection in water hammer events. *Water, MDPI* 9(1), 63.
* **Besharat, M.,** Coronado-Hernández, O.E., Fuertes-Miquel, V.S., Viseu, M.T. & Ramos H.M. 2018. Backflow air and pressure analysis in emptying pipeline containing entrapped air pocket. *Urban Water Journal* 15(8), 769-779.
* **Besharat, M.,** Coronado-Hernández, O.E., Fuertes-Miquel, V.S., Viseu, M.T. & Ramos H.M. 2019. Computational fluid dynamics for sub-atmospheric pressure analysis in pipe drainage. *Journal of Hydraulic Research, IAHR*.
* **Besharat, M.,** Dadfar, A., Viseu, M.T., Brunone, B. & Ramos, H.M. 2020. Transient-flow induced compressed air energy storage (TI-CAES) system towards new energy concept. *Water*,12(2), 601.

**Selected articles presented as prestigious conferences**

* **Besharat, M.,** Martins, S.C. & Ramos, H.M. 2014. Evaluation of energy recovery in compressed air energy storage (CAES) systems. 3rd *IAHR Europe Congress*, Porto, Portugal.
* **Besharat, M.** & Ramos, H.M. 2015. Theoretical and experimental analysis of pressure surge in a two-phase compressed air vessel. 12th *International Conference on Pressure Surges*, BHR Group, Dublin, Ireland.
* Simão, M., **Besharat, M.** & Ramos, H.M. 2018. Energy recovery using PAT. *Water Efficiency Conference*, Aveiro, Portugal.
* **Besharat, M.,** Coronado-Hernández, O.E., Fuertes-Miquel, V.S., Viseu, M.T. & Ramos, H.M. 2018. CFD and 1D simulation of water hammer effect on compressed air vessel. 13th *International Conference on Pressure Surges*, BHR Group, Bordeaux, France.

**Forthcoming publications**

* **Besharat, M.,** Vasconcelos, J.G. & Ramos, H.M. 2020. Unsteady modelling approaches and pressure damping effect in an air vessel*. Journal of Hydraulic Engineering, ASCE* (in preparation).
* **Besharat, M.,** Vasconcelos, J.G. & Ramos, H.M. 2020. Comparing unsteady modelling approaches for surges caused by closing/opening action of valve and effect of the air vessel. *World Environmental & Water Resources Congress*, Las Vegas, USA (accepted).

**Awards/Funding**

* **FCT / REDAWN, Portugal, 2016**

*The outcome provided wide knowledge regarding pressurized infrastructures and TI - CAES new energy idea.*

* **General Directorate of Environment, Iran, 2015**

Research fund titled ‘Ecological Revitalization Plan of Dried Parts of Urmia Lake with Priority of Southern Zones’

*This research was funded by the Department of Environment and UNESCO that provided feasible proposals to revitalize the southern dried parts of the Urmia Lake.*

* **Saghez City Municipality, Ministry of Interior, Iran, 2015**

Research fund titled ‘Saghez Drainage System assessment and Effective Solutions to Control the Urban Runoff’

*The outcome provided an effective and smart drainage system.*

* **Azad University, Saghez Branch, 2015**

Research fund titled ‘Extended Hydrological Study of Runoff and Hydraulic Design of Urban Drainage System’

*This research explored new technologies in urban drainage systems and helped to do more advanced research activities in storage pond idea in urban districts* (*recently published as a peer-reviewed article*).

* **Azad University, Saghez Branch, 2014**

Research fund titled ‘Energy Optimization and Sustainable Electricity Generation in Boukan-Saghez Water Conveyance System’

*This research led to an increase in energy efficiency in an existing water conveyance system.*

* **HYLOW, Portugal, 2013**

*Supported accomplishing my first PhD and provided initial knowledge for recently proposed TI-CAES idea.*

* **Selected as an outstanding researcher**

3 successive years (2014-2016), Azad University, Saghez Branch, Iran.

* **Ranked the first place**

PhD entrance evaluation and examination, University of Tabriz, Iran, 2012.

* **Ranked the Second place between graduated students**

Civil Engineering Department, Shahid Bahonar University of Kerman, Iran, 2005.

* **Ranked the first place**

For the whole study period, Civil Engineering Department, Azad University, Mahabad Branch, 2002.

**Membership**

* A certified member of Iran Construction Engineering Organization (IRCEO) (2007 to present)

*Acting as construction manager and structural engineer in several construction projects in the form of contracts, as well as an instructor in training modules for young engineers to promote skills*

* American Society of Civil Engineering (ASCE)
* International Association for Hydro-Environment Engineering and Research (IAHR) and IAHR Portugal Young Professionals Network

**Professional development**

* 4th annual meeting on H2DOC Research Program,

Laboratório Nacional de Engenharia Civil (LNEC), Lisbon, Portugal, January 2020.

* 3rd annual meeting on H2DOC Research Program,

Instituto Superior Técnico, University of Lisbon, Portugal, November 2018.

* Workshop on Advanced Measurement Techniques and Experimental Research, 3 ECTS Credits,

Vrije Universiteit, Brussel, Oostende, Belgium, October 2017

* 2nd Workshop on H2DOC Research Program, École Polytechnique Fédérale de Lausanne (EPFL), Switzerland, March 2017
* A module on Spatial Structure, 3 ECTS Credits, Prof. Hoshyar Nooshin,

Shahid Bahonar University of Kerman (*in collaboration with University of Surrey*), 2004.

**Technical Skills**

Skills:

* Hydraulic design of different water systems and components
* Design of canals and related structures
* Pipeline analysis
* Design of surge protection devices
* Wide experience in working with measurement devices

Computer tools:

* AutoCAD, Civil 3D, Storm and Sanitary Analysis (SAA)
* EPANET
* Bentley Hammer
* Water GEMS
* Matlab
* ANSYS Fluent

**Referees**

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| --- | --- | --- |
| Helena M. Ramos, PhD  Associate Professor  Department of Civil Engineering, Architecture and Georesources  Instituto Superior Técnico  University of Lisbon, Portugal  *helena.ramos@tecnico.ulisboa.pt*  Tel: (+351) 218 418 151 | António H. Cardoso, PhD  Professor  Department of Civil Engineering, Architecture and Georesources  Instituto Superior Técnico  University of Lisbon, Portugal  *antonio.cardoso@tecnico.ulisboa.pt*  Tel: (+351) 218 418 439 | Jose G. Vasconcelos, PhD  Associate Professor  Department of Civil Engineering  Auburn University  Alabama, Auburn, USA  *jgv0001@auburn.edu*  Tel: (+1) 334 844 6280 |
| Maria T. Viseu, PhD  Head of the Water Resources and Hydraulic Structures Division  Laboratório Nacional de Engenharia Civil (LNEC),  Lisbon, Portugal  *tviseu@lnec.pt*  Tel: (+351) 218 443 771 | Vicente S. Fuertes-Miquel, PhD  Associate Professor  Department of Hydraulic and Environmental Engineering Polytechnic University of Valencia  Valencia, Spain  *vfuertes@upv.es*  Tel: (+34) 963 877 000 |  |

1. FCT – Foundation of Science and Technology, Ministry for Science, Technology and Higher Education, [fct.pt](http://www.fct.pt) [↑](#footnote-ref-1)
2. REDAWN – European project titled ‘Reducing Energy Dependency in Atlantic Area Water Network’, [redawn.eu](http://www.redawn.eu) [↑](#footnote-ref-2)
3. HYLOW – European project titled ‘Development of Hydro Power Converter for Very Low Head Differences’, [hylow.eu](http://www.hylow.eu) [↑](#footnote-ref-3)
4. CERIS – ‘Civil Engineering Research and Innovation for Sustainability’ research centre, [ceris.pt](http://www.ceris.pt) [↑](#footnote-ref-4)
5. TI-CAES – Transient-flow Induced Compressed Air Energy Storage [↑](#footnote-ref-5)