# BABAK RAZDAR

Babak.Razdar@cmcc.it

## EDUCATIONS

**Doctor of Philosophy in Hydraulic Engineering for the Environmental and Territory** 2012-2016

Dept. of Environmental and Chemical Engineering, University of Calabria, Rende, Italy

**Master of Science in Civil Engineering – Water** 2004-2007

Dept. of Civil Engineering, Islamic Azad University - Tehran Central Branch, Iran

**Bachelor of Science in Agricultural Engineering – Irrigation** 2000-2004

Dept. of Irrigation Engineering, University of Guilan, Iran

## RESEARCH INTERESTS

With extensive experience in hydraulic and environmental engineering, my research over the past decade has centered on the following key areas:

- Mathematical simulation for solving two-dimensional shallow water equations
- 1D/2D numerical modeling of flood propagation and dam break scenarios
- Water quality modeling and environmental assessments
- Hydraulic and hydrological studies
- Application of machine learning, GIS, and GNSS in water resource management and environmental issues
- Climate change modeling, including IPCC-related scenarios
- Water resource management
- River engineering
- Machine learning techniques for studying urban area impacts during flood events
- Rapid flood mapping using machine learning

This diverse expertise allows me to tackle complex problems related to water resources, environmental management, flood risk assessment, and climate resilience.

## RECENT WORK EXPERIENCE

**Postdoctoral Researcher**

*Centro Euro-Mediterraneo sui Cambiamenti Climatici Foundation (CMCC)*
*Regional Models and Geo-hydrological Impacts (REMHI), Caserta, Italy*
2024 – Current
*Summary of activities:*
Conducting hydraulic and hydrological studies using climate model data and machine learning techniques.

**Postdoctoral Researcher**

*Department of Civil, Environmental, Architectural Engineering and Mathematics (DICATAM), Università degli Studi di Brescia, Brescia, Italy*

- **2023 – 2024:** Participatory research projects concerning environmental issues in the Oglio River watershed

  Supervisor: Professor Giovanna Grossi, Email: giovanna.grossi@unibs.it
  *Summary of activities:*
  - Collected disaggregated climate scenarios for Italian cities.
  - Prepared graphs and tables for scientific project reports.
  - Simulated local drainage networks using SWMM and HECRAS software.
  - Verified drainage network efficiency under future climate scenarios.
  - Supported the development of participatory research projects by collecting data on crop characteristics, irrigation supply, and hydroelectric power in the Oglio River basin.
  - Developed ad hoc climate scenarios for future projections.
- **2022 – 2023:** Mathematical modeling of flooding scenarios in industrial and highly anthropogenic areas

  Supervisor: Professor Massimo Tomirotti, Email: massimo.tomirotti@unibs.it
  *Summary of activities:*
  - Modeled flooding scenarios in industrial and anthropized areas using 2D Shallow Water Equations.
  - Simulated effects of complex topographies, wetting/drying fronts, and trans critical flows.
  - Predicted hydrodynamic impacts on industrial facilities such as storage tanks with hazardous substances.
  - Developed physically-based vulnerability models for quantitative risk assessment.
- **2021 – 2022:** Development of resilience improvement strategies for road infrastructure affected by hydrogeologic hazards using

mobile phone data
Supervisor: Professor Roberto Ranzi, Email: roberto.ranzi@unibs.it

*Summary of activities:*

- Developed ICT platforms to detect emergency events such as floods and provide public services.
- Focused on short-term forecasts for emergencies affecting road infrastructure and mobility.
- Created dynamic maps to assess exposure of people and vehicles to flooding hazards.
- Collaborated with the Department of Economics and Management to communicate flood warnings and alternative routes during emergencies.

**Researcher – Engineer**
*Department of Water Resource Monitoring, Environmental Research Institute of ACECR, Rasht, Guilan, Iran*
2019 – 2020

*Summary of activities:*

- Sampling and analyzing river water quality incoming to Anzali wetland.
- Environmental water requirement studies of Evan Lake, Ghazvin province, Iran.
- Water resource management and environmental water requirement studies using the WEAP model in Amirkelayeh wetland.

**Assistant Professor / Lecturer**
*Civil Engineering Department, Higher Education Institute of ACECR, Rasht, Guilan, Iran*
2018 – 2020

## PUBLICATIONS

- Mirbolooki, H., Mahdavi, S., Solgi, E., **Razdar, B.,** Akhzari, D., & Zarabi, M. (2025). Removal of dye pollution from aqueous solutions by biocompatible adsorbents with a sustainable water resources management approach. Journal of Water and Mitigation Management, Articles in Press, Accepted Manuscript, Available Online from 09 February 2025. https://doi.org/10.22059/jwim.2025.387650.1198.
- Mirbolooki, H., Mahdavi, S., Solgi, E., **Razdar, B**., Zarabi, M., & Akhzari, D. (2025). Equilibrium and kinetic investigation of solophenyl dye removal from aqueous solution using cellulose adsorbents. Iranian Journal of Health & Environment, 17(4), Available online. https://ijhe.tums.ac.ir.
- Modaberi, H., Karimi, M., Moghadami, S., Yazdany, P., & **Razdar, . B**. (2024). Determination of Minimum Ecological Value of Wetland and Assessment of Hydrologic Alteration Indicators Affecting Local Communities' Livelihood: Case Study Anzali Wetland. Journal of Global Humanities and Social Sciences, 5(2), 67–76. https://doi.org/10.61360/BoniGHSS242016010202.
- Mahsa Malmir, Saman Javadi, Ali Moridi, Aminreza Neshat & **Babak Razdar**. (2021). A new combined framework for sustainable development using the DPSIR approach and numerical modeling. Journal of Geoscience Frontiers (12). https://doi.org/10.1016/j.gsf.2021.101169
- Sami ghordoei, Milan., Arya azar, Naser., Javadi, Saman & **Razdar, Babak**. (2020). Comparison Groundwater level simulation resultes using Least-Squares Support-Vector Machine (LS-SVM) model with Artificial Neural Network (ANN) and Multivariate Linear Regression (MLR), Journal of Hydrogeology, University of Tabriz, 5 (1), 118- 133. (in Persion) https://hydro.tabrizu.ac.ir/article_10455.html?lang=en
- Macchione, F., Costabile, P., Costanzo, C., De Lorenzo, G & **Razdar, B**. (2016). Dam breach modelling: influence on downstream water levels and a proposal of a physically based module for flood propagation software. IWA Publishing. Journal of Hydro informatics, 18 (4): 615–633. https://doi.org/10.2166/hydro.2015.250
- Macchione, F., De Lorenzo, G., Costabile, P., & **Razdar, B**. (2015). The power function for representing the reservoir rating curve: morphological meaning and suitability for dam breach modeling. Water Resources Management. (13) DOI 10.1007/sl 1269-016-1458-8
- **Razdar, B**., Mohammadi, K., Samani, J.M.V & Pirooz, B. (2012). Determining the best water quality model for the rivers in the north of Iran (case study: Pasikhan River). Journal of Computational Methods in Civil Engineering (CMCE). 2 (1). https://cmce.guilan.ac.ir/article_898.html

## SELECTED CONFERENCE PRESENTATIONS

- Golmar Golmohammadi, **Babak Razdar**, Kourosh Mohammadi, Giovanna Grossi, and Saman Javadi.: A comprehensive method based on machine learning schemes in predicting river flow, case study: Po River, EGU General Assembly 2024, Vienna, Austria, 16 Apr 2024, EGU24-4402, https://doi.org/10.5194/egusphere-egu24-4402.

- **Razdar, B**., Metulini, R., Carpita, M., Vassena, G. P. M, and Ranzi, R.: Flood risk management using mobile phone data and hydrological modeling in a heavily urbanized area in Lombardy, 9th International Conference on Risk Analysis (ICRA9), Perugia, Italy, 25-27 May 2022.
- **Razdar, B**., Metulini, R., Carpita, M., and Ranzi, R.: Dynamic flood hazard maps based on traffic flow forecasts using mobile phone data, EGU General Assembly 2022, Vienna, Austria, 23–27 May 2022, EGU22-3200, https://doi.org/10.5194/egusphere-egu22-3200, 2022.
- Mirzaei, H & **Razdar, B**. (2021). Risk analysis of urban drainage systems (Case study of surface waterdrainage systems in Baqer mahaleh, Tolamshahr), The 7th International Conference on Environmental Engineering and Natural Resource, Tehran, Iran.
- Mirbolooki, H., **Razdar, B** & Mohafezatkar, M. (2020). Reservoir water quality assessment using multivariate methods (Case study: Diversion dams in Guilan province), 6th International Conference on Science and Technology with Sustainable Development Approach, Tehran, Iran.

## TEACHING AND MENTORING EXPERIENCE

- **Lecturer and Mentoring (2018-2025)**
  *Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.*

**Lectures:**

**B.Sc.**
- Strength of materials
- Design of hydraulic structures

**M.Sc.**
- River engineering
- Fundamental and modelling pollution transport
- Hydraulic structures

**Theses:**

- Feasibility Study of Removing Dye Compounds from Aqueous Solutions Using Optimized Grape Waste Adsorbents, 2025, Ph.D. Dissertation in Environmental Science and Engineering, Malayer University, Hamedan, Iran.
- Feasibility study of extraction and purification of methane gas from Saravan landfill and its use as fuel, Master of science in Civil engineering – Environmental engineering, 2019, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Feasibility study of using effluent of Rasht wastewater treatment plant for irrigation of urban green space
- (Case study of Fakhab Rasht treatment plant), Master of science in Civil engineering – Environmental engineering, 2019, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Investigating the leakage rate of water branches systems in Amlash city using the hydraulic analysis
- model, Master of science in Civil engineering – Environmental engineering, 2019, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Reservoir water quality assessment using multivariate methods (Case study: Diversion dams in Guilan
- province), Master of science in Civil engineering – Environmental engineering, 2019, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Investigative procedures for assessing subsidence risk for earth dams using Geo-slope model (Case study:
- Emarat dam), Master of science in Civil engineering – Environmental engineering, 2019, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Investigation and tracking of floating debris at the Caspian Sea using Mike 21 model (Case study, Caspian
- commercial zone , Guilan, Iran), Master of science in Civil engineering – Environmental engineering, 2018, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.
- Assessment and monitoring of groundwater pollution in landfill sites (Case study, Saravan Landfill, Rasht,
- Iran), Master of science in Civil engineering – Environmental engineering, 2018, Higher education institute of Academic Center for Education, Culture and Research (ACECR), Rasht, Guilan, Iran.