

# CIVIL AND ENVIRONMENTAL ENGINEERING

## PNRR/RETURN - Development of methodologies and tools for large-scale hydrological data analysis and visualization

<b>Funded By</b>	MINISTERO DELL'UNIVERSITA' E DELLA RICERCA [P.iva/CF:97429780584] Politecnico di TORINO [P.iva/CF:00518460019]
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<b>Context of the research activity</b>	<p>This research focuses on creating a robust methodology and an advanced tool for the analysis and visualization of hydrological data across large areas, encompassing multiple Italian regions. The project aims to facilitate better design rainfall and flood risk analyses. By integrating diverse data sources and advanced visualization techniques, the tool will support decision-making processes in environmental and urban planning.</p> <p>"PNRR M4C2, Investimento 1.3 - Avviso n. 341 del 15/03/2022 - PE0000005 Multi risk science for resilient communities under a changing climate (RETURN) - CUP E13C22001860001"</p>
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<b>Objectives</b>	<p>Effective management of design rainfall and flood risks is a growing challenge due to the impacts of climate change, increasing urbanization, and population growth. This Ph.D project focuses on developing a robust methodology and an advanced tool for the analysis and visualization of hydrological data over large areas, encompassing multiple Italian regions. By integrating diverse data sources and employing advanced visualization techniques, the project aims to enhance the knowledge of the design rainfall and support decision-making processes in environmental and urban planning.</p> <p>More specifically, the primary objectives of this project are:</p> <ol style="list-style-type: none"><li>1) Create a scalable and flexible methodology for collecting, processing, and analyzing hydrological data from diverse sources, ensuring high accuracy and reliability;</li><li>2) Develop an intuitive and powerful software tool that integrates advanced data visualization techniques to facilitate the interpretation and communication of hydrological data;</li><li>3) Improve flood risk assessment and mitigation strategies through detailed and comprehensive hydrological data analysis;</li><li>4) Enable informed decision-making processes in environmental and urban</li></ol>
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planning through accessible and interpretable data visualizations.

**Skills and competencies for the development of the activity**

Candidates should have an MSc degree in civil or environmental engineering. Good coding skills (Matlab or R), and a good knowledge of hydrology, GIS software and WebGIS are needed. Candidates with previous experience with the management and analysis of hydrological data are preferred.