



# PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 38th cycle

**PARTENARIATO PNRR Research Field: ADVANCING DROUGHT DETECTION AND MANAGEMENT TO IMPROVE THE RESILIENCE OF MULTISECTOR SYSTEMS UNDER CLIMATE CHANGE**

**Monthly net income of PhDscholarship (max 36 months)**

**€ 1400.0**

In case of a change of the welfare rates during the three-year period, the amount could be modified.

## Context of the research activity

**Motivation and objectives of the research in this field**

Climate change will severely affect freshwater availability across much of Europe by the end of the 21st century. In a warmer climate, many river basins, especially in Southern Europe and the Mediterranean region, are likely to become more prone to periods of water scarcity, with projections indicating up to a 40 percent reduction in minimum streamflow by the 2080s in this area. The cost of drought in Europe, which in the last decades amounted to over 9 billion euros per year, will considerably increase as future droughts are expected to be more severe and long-lasting. Although drought monitoring and management are extensively studied in the literature, traditional drought indices often fail at yielding precise information on detecting critical events and trigger timely adaptation measures.

The research will aim at the definition of novel impact-based drought indices for advancing the detection of drought events by better capturing their impacts on different socio-economic sectors. The resulting indices will be then used for informing the strategic planning of drought management strategies in order to improve drought resilience under historical and projected climatic conditions. The position is cofounded by RETURN - MULTI RISK SCIENCE FOR RESILIENT COMMUNITIES UNDER A CHANGING CLIMATE.



	<p>this Research topic is in the framework of  RETURN - PARTENARIATO ESTESO MULTI-RISK  SCIENCE FOR RESILIENT COMMUNITIES UNDER A  CHANGING CLIMATE  cup - D43C22003030002  Decreto di Concessione D.D. 1552 del 11/10/2022  D.D. 341 del 15/03/2022 Avviso pubblico per la  presentazione di Proposte di intervento per la creazione di  ?Partenariati estesi alle università, ai centri di ricerca, alle  aziende per il finanziamento di progetti di ricerca di base?  ? nell?ambito del Piano Nazionale di Ripresa e  Resilienza, Missione 4 ?Istruzione e ricerca? ?  Componente 2 ?Dalla ricerca all?impresa? ? Investimento  1.3, finanziato dall?Unione europea ? NextGenerationEU</p>
<b>Methods and techniques that will be developed and used to carry out the research</b>	<p>State-of-the-art and innovative drought detection methods will be used together with optimization, optimal control, and mathematical modelling of multisector systems. Big data, statistics, and machine learning will be leveraged to manipulate and examine the large set of observation, reanalysis, and climate simulations/projections available at the global, continental, national, and local scale.</p>
<b>Educational objectives</b>	<p>The doctoral program offers advanced training organized in three pillars:</p> <ul style="list-style-type: none"> <li>- Basic Research, which includes methodological courses related to key aspects of theoretical and applied research in science, policy, and technology of sustainable change;</li> <li>- Specific Research, designed to strengthen candidates? knowledge on specific topics aligned with their research interests and increase their presence in the international scientific community through participation in conferences and presentation of their scientific work in academic contexts.</li> <li>- Development of the Doctoral Thesis, which allows candidates to develop leading-edge research competencies and produce original scientific work on a topic that contributes to scientific debate and has societal impacts.</li> </ul> <p>A period of study in worldwide most recognized research institutions is supported by the doctoral school and the supervisor.</p>



<b>Job opportunities</b>	The PhD graduates will be equipped with distinctive skills and advanced trans-disciplinary knowledge that open up career opportunities as analysts, researchers, or planners at universities, international research centers, public and international institutions, R&D departments, regulatory authorities, policy institutions, and other public bodies.
<b>Composition of the research group</b>	1 Full Professors 0 Associated Professors 2 Assistant Professors 5 PhD Students
<b>Name of the research directors</b>	Prof. Andrea Castelletti ; Prof. Matteo Giuliani

<b>Contacts</b>
<p>Matteo Giuliani, PhD Assistant Professor Environmental Intelligence Lab Dept. of Electronics, Information, and Bioengineering Politecnico di Milano Piazza Leonardo da Vinci, 32 I-20133 Milano, Italy Phone: +39 (0)2 2399 9040</p> <p>Andrea Castelletti, PhD, PE Professor Head, Environmental Intelligence Lab Dept. of Electronics, Information, and Bioengineering Politecnico di Milano Piazza Leonardo da Vinci, 32 I-20133 Milano, Italy Phone: +39 (0)2 2399 3584</p> <p><a href="https://www.ei.deib.polimi.it/">https://www.ei.deib.polimi.it/</a></p>

<b>Additional support - Financial aid per PhD student per year (gross amount)</b>	
<b>Housing - Foreign Students</b>	--
<b>Housing - Out-of-town residents (more than 80Km out of Milano)</b>	--

<b>Scholarship Increase for a period abroad</b>	
<b>Amount monthly</b>	700.0 €
<b>By number of months</b>	6



**Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information**

A desk in the lab offices and a personal laptop will be provided over the duration of the PhD programme. Teaching assistantship opportunities might be available over the triennium. Supercomputing facilities are available both at the department and with external associated partners.

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cup - D43C22003030002

Decreto di Concessione D.D. 1552 del 11/10/2022

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