POLITECNICO DI MILANO

PhD in SCIENCE, TECHNOLOGY AND POLICY FOR SUSTAINABLE CHANGE - 39th cycle

PARTENARIATO PNRR Research Field: MULTISECTOR CLIMATE ADAPTATION STRATEGIES IN EUROPEAN RIVERS

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 is expected to have a major impact on freshwater availability in Europe by the end of the 21st century. In particular, river basins in Southern Europe and the Mediterranean region are likely to experience more frequent and intense periods of water scarcity, with projections indicating a potential reduction of up to 40 percent in minimum streamflow by the 2080s. The cost of drought in Europe, which has already amounted to over 9 billion euros per year in recent decades, is expected to increase significantly due to the more severe and prolonged droughts. To ensure energy and food security and to prevent riverine ecosystem degradation, it is essential to design effective climate adaptation measures. This research will focus on developing novel tools to support the design of robust, multisector, multiactor adaptation strategies that can adapt to changing hydrologic regimes and socio-economic drivers. Rather than considering single sectors in isolation, the research will take a holistic approach to better understand the complex interplay between human and natural systems, including interconnected multisector dynamics and multiactor adaptation pathways. This position is cofunded by RETURN - MULTI RISK SCIENCE FOR RESILIENT COMMUNITIES UNDER A CHANGING CLIMATE. 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
Methods and techniques that will be developed and used to carry out the research	State-of-the-art robust decision making will be used together with optimization, optimal control, and mathematical modelling of multisector and multiactor systems. Social learning and behavior modelling will reinforce essential baseline for adaptation.Big data, statistics, and machine learning will be leveraged to manipulate and examine the large set of observation, model simulations, and future scenarios and inform the design of adaptation strategies.
Educational objectives	The doctoral program offers advanced training organized in three pillars: - Basic Research, which includes methodological courses related to key aspects of theoretical and applied research in science, policy, and technology of sustainable change; - 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. - 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. A period of study in worldwide most recognized research institutions is supported by the doctoral school and the

	supervisor.
Job opportunities	The PhD graduates will be equipped withdistinctive skills, multifocal and bottom-up approaches, and advanced trans-disciplinary knowledge that open up career opportunities as analysts, researchers, or planners at universities, institutions, R&D departments, regulatory authorities, and other public bodies.
Composition of the research group	1 Full Professors 0 Associated Professors 3 Assistant Professors 5 PhD Students
Name of the research directors	Andrea Castelletti

Contacts

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Additional support - Financial aid per PhD student per year (gross amount)

	1st year	2nd year	3rd year
Housing - Foreign Students	2500.0 € per student	2500.0 € per student	2500.0 € per student
	max number of financial aid available: 1, given in order of merit ..		
Housing - Out-of-town residents (more than 80Km out of Milano)	--		

Scholarship Increase for a period abroad	
Amount monthly	700.0 €
By number of months	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 program. Teaching assistantship opportunities might be available over the triennium. The PhD student is encouraged to take part in teaching activities, within the limits allowed by the regulations. Super-computing facilities are available at the department.

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