ANNEX 8

ID NUMBER	MERC_08
PHD TITLE	**MODELING AND ENGINEERING RISK AND COMPLEXITY**
AVAILABLE POSITIONS	1 SSM Doctoral Fellowship
	5 PNRR Doctoral Fellowships (on research themes relevant for the PNRR)
	2 PNRR Doctoral Fellowships – Public Administration (on research themes relevant for the specific PNRR subprogram)
	1 PNRR Doctoral Fellowship – Digital and Environmental Transition (on research themes relevant for the specific PNRR subprogram)
PHD AND SELECTION FEATURES	The Ph.D. program in Modeling and Engineering Risk and Complexity (MERC) is a 4 years study and research program characterized by a highly interdisciplinary approach combining Applied Mathematics, Physics and Engineering to address the modeling, analysis, control and management of complex systems, the design and engineering of resilient systems and infrastructures and the analysis and management of risks and cascade effects therein. The program is aimed both to students interested in developing new methodological approaches on the study of risk and complex systems and to those interested in their applications. At the core of the program there is a virtuous cycle between theory and applications whereas new theory can lead to new applications and new applications can stimulate the development of new theoretical approaches. The application areas of interest include (but are not limited to) civil engineering, automation and control engineering, mathematical engineering, environmental engineering, industrial engineering, infrastructures and distribution networks, process engineering, economics and finance and the analysis of natural and antropic risks. The admission to the Ph.D. program is granted after passing a public competition based on **qualifications, a scientific report and an interview**. A Selection Committee will examine the qualifications and the scientific reports of the applicants. A score of maximum 60 points will be assigned at this stage. Then a short list of applicants will be admitted to the interviews, where a score of maximum 40 points will be assigned to each candidate.
DESCRIPTION OF THE RESEARCH LINES OF THE DOCTORAL PROGRAM	The objective of this Ph.D. program is to allow its students to develop new methodological approaches to study risk and complex systems establishing a virtuous cycle between theory and applications. To this end the doctoral program in MERC starts with a first year of training and study aimed at strengthening the students' background in a highly interdisciplinary way. Courses delivered by internationally reknown researchers incude, to give some examples, those on dynamical systems and control, statistics and probability, stochastic differential equations, PDEs, numerical analysis of complex systems, modeling and analysing complex networks, risk analysis, early warning systems, fundamentals of natural hazards, industrial risk, reinforcement learning and data-driven control. During their first year students select the topic on which they intend to carry out their research program [examples of this

	year research project proposals can be found on the website of the MERC PhD program (see address below)]. Recipients of PNRR fellowships are expected to be involved in one of the research topics outlined in the PNRR plan, for more information see https://www.governo.it/sites/governo.it/files/PNRR.pdf). These topics focus on the development of knowledge, including applied knowledge, in public research institutions.
SCIENTIFIC COORDINATOR	Prof. Mario di Bernardo
SCIENTIFIC REPORT TO BE ATTACHED TO THE APPLICATION	Scientific report in English (max. 2,500 words/15,000 characters, short bibliography included) with a description of the topic of the master's thesis or a scientific topic addressed subsequently by the candidate in the course of her/his experience, divided into sections illustrating the state of the art, objectives, results obtained, methodology used, and possible future developments.
COURSE LENGTH (IN YEARS)	4
ANNUAL GROSS AMOUNT OF THE SCHOLARSHIP	€19,000 + 50% increase of the monthly installment of the fellowship for stays abroad (for a maximum of 12 monthly installments)
RESEARCH BUDGET	10% of the fellowship in the first year, 20% of the fellowship in the three following years
E-MAIL ADDRESS FOR INFORMATION	merc@ssmeridionale.it
PROGRAM'S WEBPAGE	https://www.ssmeridionale.it/en-us/dottorato/rubriche/modeling-and-engineering-risk-and-complexity-merc-3123-1-017870059a030b9af70ed6080d930af0
WEBPAGE FOR INFORMATION AND NOTIFICATIONS TO CANDIDATES	https://www.ssmeridionale.it/en-us/la-scuola/bandi-di-concorso/dottorati