



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

THEMATIC Research Field: DATA-SCIENCE EVALUATION OF CLIMATE CHANGE SCENARIOS AND POLICIES

Monthly net income of PhDscholarship (max 36 months)

€ 1500.0

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

Mathematical models have become central tools in global environmental assessments. To serve society well, climate change stabilization assessments must capture the uncertainties of the deep future, be statistically sound and track near-term disruptions. Up to now, conceptual, computational, and data constraints have limited the quantification of uncertainties of climate stabilization pathways and policies to a narrow set. The statistical interpretation of scenarios generated by multi-model ensembles is problematic due to availability biases and model dependencies. Scenario plausibility assessments are scant. Simplified, single-objective decision criteria frameworks are used to translate decarbonization uncertainties into decision rules whose understanding is not validated. The aim of these scholarships, funded by the ERC project EUNICE, is to apply machine learning and statistical methods for characterizing future climate uncertainties, eliminate statistical biases, pin down near-term correlates of long-term policy objectives, and identify early signals of scenario plausibility through prediction polls.

Methods and techniques that will be developed and used to carry out the research

The research will use state-of-the-art statistical and machine-learning techniques. These involve global sensitivity analysis methods, machine learning algorithms such as hierarchical clustering, kriging, etc. and econometric methods for policy evaluation. The PhD candidates will apply these methods to a variety of data



	candidates will apply these methods to a variety of data sources, including scenarios generated by models, original data obtained from prediction polls or other elicitation methods, and climate and energy data at high resolution. The statistical toolbox will be used to address a variety of questions, including how deep uncertainties can be propagated into the future, how statistical biases in model ensembles can be removed, how new algorithms can be combined with human ingenuity to predict the emergence of new behavior and of positive and negative tipping points.
Educational objectives	The objectives are to educate on the application of machine learning and econometric methods to the understanding of climate change mitigation and adaptation policies and their uncertainties.
Job opportunities	Professional careers up in universities, research organizations, national and international institutions interested in ex-ante evaluation of energy and climate policies through mathematical models.
Composition of the research group	1 Full Professors 0 Associated Professors 2 Assistant Professors 0 PhD Students
Name of the research directors	Prof. Massimo Tavoni

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

Scholarship Increase for a period abroad	
Amount monthly	750.0 €
By number of months	6

Additional information: educational activity, teaching assistantship, computer availability, desk availability, any other information
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Computer and desk will be provided. Teaching assistantship opportunities will possibly be available. The candidate will have the opportunity to be affiliated with the European Institute on Economics and the Environment, part of Fondazione CMCC, the Italian research institute on climate change of which Politecnico di Milano is one of the members.