

T.I.M.E. Projects 2022--2023



Application Form

Title of Project	
Training School on Modelling Compound climate-related Events	
Acronym (if any)	
TSM-CE	
Details of the Applicant	
Name of Institution(s)	Politecnico di Milano
Faculty/Department/Office	Department of Civil and Environmental Engineering
Contact Person/s and Details	Carlo De Michele (Full professor) Politecnico di Milano P.zza L. da Vinci 32, 20133, Milano, Italy @: carlo.demichele@polimi.it Mobile: +39 – 347-7020843
Summary of the Project (max. 2000 characters)	
<p>June and July 2021 have been characterised by extraordinary natural events, like the heatwave occurred on the Pacific Coast of the United States and Canada, and the flood event occurred in Northern Europe. In particular, during the former the U.S. Pacific Coast and Canada experienced temperatures never previously observed, with records broken in multiple cities by several degrees Celsius; while during the latter, several European countries have been affected by catastrophic and concurrent floods, causing deaths and widespread damages. These events extended over rather large spatial and temporal scales, and manifested with cascading effects, interconnected behaviours and hazards. They are classified as “compound climate-related events” (Zscheischler et al. 2020). These events are an emerging topic in science for the enormous impacts on the society, as illustrated by the website http://damocles.compoundevents.org of the DAMOCLES project, or by the special issues on top international journals (https://www.journals.elsevier.com/weather-and-climate-extremes/call-for-papers/special-issue-on-compound-weather-and-climate-events) or by the papers recently appeared on top international journals like Nature Climate Change (Raymond et al. 2020) or Nature Communications (Ridder et al. 2020).</p> <p>Compound climate-related events can pose serious threats to natural systems and human societies. Modelling and predicting compound events requires knowledge on advanced statistical methods (Salvadori et al. 2007).</p> <p>This project intend to propose a Training School on Modelling Compound climate-related Events to train the next generation of researchers and scientists to deal with such complex and impactful events. The school, targeted for PhD students, will be two weeks long, and provide tools and methodologies to investigate compound events. In addition, there will be ample time to work on scientific projects organized in four small groups and socialize with the other participants and lecturers.</p>	

Reason for applying for T.I.M.E. funding (max. 2000 characters)

We decided to apply for T.I.M.E. funding for two main reasons:

- The training school will be a wonderful example to promote the role and spread the benefits of international education deriving by the combined efforts of Politecnico di Milano, Technische Universität Dresden, and Vrije Universiteit Brussel.
- The training school will provide also an example of short joint study among these three universities.

Expected outputs of the project

- 1) Improve the scientific collaboration among Politecnico di Milano, Technische Universität Dresden, and Vrije Universiteit Brussel;
- 2) Provide guidelines to deal with Compound climate-related Events;
- 3) Provide practical results in modelling Compound climate-based Events summarized in four scientific publications (one for each working group) on international journals with high impact factor (like Nature Scientific Reports; Environmental Research Letters; Nature Communications).

Target group/s and expected impact

The target of the advanced school is to train 20-24 PhD students, organized in four working groups, providing them advanced tools and expertise to deal with Compound climate-related Events.

These PhD students will receive an advanced training, making them more appealing in the working market, with respect to institutions and organizations interested in dealing/coping with such complex natural hazards.

Sustainability of the programme

The sustainability of the programme is based on some key points:

- Clear definition of the aims of the project;
- Past experience of the proposers in the organization of training schools;
- Availability also of an external support (Regione Lombardia+other funds available to the proposers) which makes the proposal robust.

Specific deliverables

The deliverables will be represented by four scientific papers which will be published on international journals with high impact factor, like Nature Scientific Reports; Environmental Research Letters; Nature Communications.

Total duration of the project

The training school is two-week long: 26 September 2022 – 08 October 2022.

The organization of the training school will require time in advance for the preparation of the time schedule, contact lecturers, prepare the leaflet of the school, spread the leaflet in the scientific community, select the PhD students. This time will be distributed in the period March 2022 --- September 2022.

Planned budget
30000 Euros. This is the budget for the two-week school including the costs for renting the spaces; catering; organization and management of PhD students; invitation of key lecturers, support of 1-2 deserving students.
Requested financial support from T.I.M.E.
10000 Euros. This amount will be used to cover partially the renting costs of the spaces.
Other sources of funding
Regione Lombardia will provide 10000 Euros, while other 10000 Euros will be provided by funds secured of the proposers.
Members of the consortium
<ul style="list-style-type: none"> - Politecnico di Milano (Italy) - Technische Universität Dresden (Germany) - Vrije Universiteit Brussel (Belgium)
<p>Key people:</p> <ol style="list-style-type: none"> 1. Carlo De Michele -Project Leader (Politecnico di Milano, Italy) 2. Jakob Zscheischler (Technische Universität Dresden, Germany) 3. Wim Thiery (Vrije Universiteit Brussel, Belgium) <p>In addition, other distinguished scientists will be part of the Scientific Committee of the School.</p>
Key Staff (Name, Position, E---mail)
<ul style="list-style-type: none"> - Alberto Guadagnini - Head of the Department of Civil and Environmental Engineering at Politecnico di Milano, Full professor, alberto.guadagnini@polimi.it - Daniela Fagnani – Administrative Manager of the Department of Civil and Environmental Engineering at Politecnico di Milano, daniela.fagnani@polimi.it
<p>References</p> <p>Raymond, C., Horton, R.M., <u>Zscheischler, J.</u> <i>et al.</i> Understanding and managing connected extreme events. <i>Nat. Clim. Chang.</i> 10, 611–621 (2020). https://doi.org/10.1038/s41558-020-0790-4.</p> <p>Ridder, N.N., Pitman, A.J., Westra, S. <i>et al.</i> Global hotspots for the occurrence of compound events. <i>Nat Commun</i> 11, 5956 (2020). https://doi.org/10.1038/s41467-020-19639-3</p> <p>Salvadori G., <u>De Michele C.</u>, Kottegoda, N. T., & Rosso (2007) – Extremes in Nature: An approach using Copulas, volume 56 of Water Science and Technology Library Series. Springer, Dordrecht, 2007. ISBN: 978-1-4020-4415-1.</p> <p><u>Zscheischler, J.</u>, Martius, O., Westra, S., Bevacqua, E., Raymond, C., Horton, R. M., van den Hurk, B., AghaKouchak, A., Jézéquel, A., Mahecha, M. D., Maraun, D., Ramos, A. M., Ridder, N., <u>Thiery, W.</u>, and Vignotto, E. (2020). A typology of compound weather and climate events, <i>Nature Reviews Earth and Environment</i>, https://doi.org/10.1038/s43017-020-0060-z, 2020.</p>



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Milan, 14th December, 2021

DEPARTMENT OF CIVIL
AND ENVIRONMENTAL
ENGINEERING

T.I.M.E. Association
To whom it may concern

Subject: letter of support for the project “Training School on Modelling Compound climate-related Events” within the T.I.M.E. call for projects 2022

Dear Sirs,

the undersigned Prof. Alberto Guadagnini, Head of the Department of Civil and Environmental Engineering at Politecnico di Milano, is glad to confirm the support of the Department with regard to the project entitled “Training School on Modelling Compound climate-related Events” proposed by Prof. Carlo De Michele within the T.I.M.E. call for projects 2022.

I thank you for your kind attention.

Best regards,

The Head of the Department
Prof. Alberto Guadagnini