



**POLITECNICO
DI TORINO**

Dipartimento di Ingegneria
dell'Ambiente, del Territorio
e delle Infrastrutture

1 PhD fellow position (3-years) in the fields of Climate Dynamics and Earth System Modelling at Politecnico di Torino (H2020 MSCA ITN CriticalEarth)

The position is part of the CriticalEarth project – a Horizon 2020 Marie Skłodowska-Curie Actions, Innovative Training Network (ITN).

We would like to encourage applications from [candidates worldwide](#) wishing to pursue a PhD degree in the field of Climate Dynamics and Earth System Modelling with an interest in the research areas: Earth System Modelling, climate simulation, ocean-atmosphere-sea ice processes and tipping point behaviour.

Politecnico di Torino, Italy, is offering a PhD Fellowship for an early-stage researcher (ESR), starting between 01.07.2021 and 01.11.2021. The selected candidate will be enrolled in the Doctoral School of Politecnico di Torino with the option of being awarded a PhD Degree in Environmental and Civil Engineering. The ESR will be hosted at the Department of Environment, Land and Infrastructure Engineering (DIATI).

The position is posted as part of the exciting **CriticalEarth** project, *Multiscale Critical Transitions in the Earth System*, funded by the European Union through the Horizon 2020 Marie Skłodowska-Curie Actions programme under Grant number 956170. The CriticalEarth consortium comprises universities with researchers who are leading experts on study of theoretical physics, mathematics, and climate. The successful candidate will join an international network of 15 PhD Fellows (ESRs), pursuing their research training on new methods for assessing the mechanisms and associated risks of critical transitions in the climate. The position will offer you an excellent background, working within a strong, cross-disciplinary network among leading Universities and research institutions across Europe and with contacts to industry, governmental- and non-governmental institutions.

ESR Project Title: Mechanisms of low-frequency oscillations of Meridional Overturning Circulation in an EMIC and in a state-of-the-art fully-coupled Earth-System model

Principal supervisor: Prof. Jost von Hardenberg, DIATI, Politecnico di Torino.

Project Description: Significant multi-centennial low-frequency oscillations in meridional oceanic circulation (MOC), and the possibility of a weakening in particular of the Atlantic MOC, have been reported in different configurations of current state-of-the-art global Earth-System models and models of intermediate complexity, in different set-ups, including future climate projections. For example, the CMIP6 version of the EC-Earth global climate model presents oscillatory cycles with an approximate period of 200 years in the strength of AMOC in its pre-industrial simulation. Similarly, significant multi-centennial low-frequency oscillations in AMOC have been reported in a fully coupled version of an Earth-system Model of Intermediate Complexity (EMIC), the Planet Simulator (PlaSIM). This project will investigate the relevant feedbacks between sea-ice dynamics, freshwater forcing and wind stress contributing to such oscillations, starting by a numerical investigation in a realistic present-day configuration using a coupled atmosphere-ocean-sea-ice configuration of the PlaSIM EMIC. The identification of the main mechanisms at work will then be used to design and perform selected sensitivity experiments with the coupled Earth System model EC-Earth, helping to assess the sensitivity of AMOC to details of the chosen parameterizations and to explore the conditions leading to a possible weakening or shutdown of AMOC.

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The project includes two secondment periods for a total of 6 months at the University of Reading, UK (developing a theory on climate sensitivity in the AMOC) and at the Institute of Atmospheric Sciences and Climate, Consiglio Nazionale delle Ricerche in Bologna, Italy (providing training on the state-of-the-art EC-Earth Earth-System model).

Job description:

The position is available for a 3-year period and your key tasks as a PhD student at Politecnico di Torino are:

- To work independently, develop and carry through your research project
- Comply with the PhD training program at Politecnico di Torino
- Write scientific articles and your PhD thesis with support from your supervisors.
- Disseminate your research, participate in network related and international conferences and workshops
- To stay at partner research institutions for at least six months total to develop new skills
- Contribute to the everyday activities at the department.

Benefits

The selected candidates will receive a 36-months, full-time employment contract as per Marie Skłodowska-Curie Actions (MSCA) regulations for early stage researchers, with a highly competitive salary, including a generous monthly living and mobility allowance and (if eligible) a monthly family allowance.

The **gross salary** consists of:

- **living allowance: 3.270 EUR/month (39.240 EUR/year)**, multiplied by the country correction coefficient of the country where the researcher is recruited (for Italy: 104,4%).
- **mobility allowance: 600 EUR/month (7.200 EUR/year)**
- **family allowance**, if applicable - depending on the family situation at the time when the contract is being concluded: **500 EUR/month**. This amount will be paid should the researcher have family, regardless of whether the family will move with the researcher or not. In this context, family is defined as persons linked to the researcher by (i) marriage, or (ii) a relationship with equivalent status to a marriage recognised by the national or relevant regional legislation of the country where this relationship was formalised; or (iii) dependent children who are actually being maintained by the researcher.

The gross salary is subject to local tax, social benefit and other deductions following applicable national regulations of the country in which the researcher is recruited. If you need further details please contact recruitment.ce@polito.it.

Formal requirements

Applicants should hold an MSc degree in physics, engineering, applied mathematics or similar, with outstanding background results, as well as display good English skills.



While not an essential requirement, any relevant work or research experience and/or scientific publications (if any) will be taken into account. In particular research or study experience in the fields of climate data analysis, numerical climate modelling, climate dynamics, climate process studies and experience with software programming languages and geoscientific analysis tools will be beneficial.

Specific requirements: Since the aim of EU ITN MSCA H2020 projects is to attract candidates from worldwide locations, **applicants must not** have resided and not have carried out their main activity (work, studies, etc.) in Italy for more than 12 months in the 3 years immediately before the recruitment date — unless as part of a procedure for obtaining refugee status under the Geneva Convention(1). If you are applying from a location that requires a visa or permit, then we will be able to provide support and advice throughout the process of relocation for you and your family. Feel free to ask us questions in advance if you need more information and reassurance.

The applicant must be an Early Stage Researcher (ESR) i.e. at the time of recruitment she/he must be in the first 4 years (full-time equivalent research experience)(2) of her/his research career and must not have been awarded a doctoral degree.

Application Procedure:

The application, *in English*, must be submitted electronically to Prof. Jost von Hardenberg using the email address: recruitment.ce@polito.it

The deadline for applications is 15 April 2021, 23:00 CET.

Please include:

- Application form available at https://cdn5.euraxess.org/sites/default/files/application-forms/application_form_critical_earth_0.pdf
- Cover Letter (max 2 pages, in English) describing research interests, main skills, career plans and the reasons for applying to the selected ESR position.
- CV (in English using [Europass CV format](#)) with relevant work and study experience (if any) and adding other relevant information, e.g. a list of publications (if any)
- Two reference letters
- Diploma and transcripts of records (both BSc and MSc)
- If already available, a valid GRE General Test certificate. If needed, the certificate can be obtained following a test at Politecnico di Torino.
- English language certificate (see the following table for details)

Details of these admission requirements are as follows:



Master's Degree recognized valid by PoliTo Doctoral School	M.Sc. degree (i.e. 2° level title, as defined by the Bologna Process), issued by an officially recognized academic institution, which grants admission in PhD programmes in the country of issuance. In order to evaluate the University career, the candidate should provide: Master's Degree and transcript of records of the Master's Degree, Bachelor's Degree and transcript of records of the Bachelor's Degree. The documents shall be issued by the relevant university in one of the following languages: Italian, English, French, Portuguese or Spanish <u>To be verified by PoliTo Doctoral School before the interviews.</u>
GRE® General Test	Valid GRE certificate to be presented by October 31 st (or before enrollment to PoliTO). If needed, the certificate can be obtained following a test at Politecnico di Torino.
English language certificate	One of the following certificates of English language knowledge, regardless of when they were issued: - IELTS with a minimum score of 5.0; - one of the language certificates recognized equivalent to IELTS 5.0 by the Foreign Languages Centre and detained in the table published at https://shorturl.at/JNS06 or a declaration of having a Ba. and/or M.Sc. degree issued by a University in which courses are taught in English, i.e. "The medium of instruction was English".

The signed Application Form and all the above documentation shall be produced **as a single PDF document** (*the PDF file name should start with the last name of candidate*).

The PDF file must be submitted by email to the following address **by April 15th, 2021 at 23:00 CET**:
recruitment.ce@polito.it

Selection process

The **selection procedure** will be based on the following steps:

- preliminary compliance check with the MSCA eligibility criteria and the specific requirements of the ESR project (degree, specific mandatory skills, specific requirements of the Doctoral School). Incorrect or lacking documentation may invalidate the recruitment procedure.
- screening of all the applications received and candidate shortlisting based on CV, academic transcripts, reference letters, motivation and relevance with the specific research project.



- interview (Skype or other) of shortlisted candidates.
- final selection and ranking of suitable candidates and identification of the successful candidate.

Politecnico di Torino wishes our staff to reflect the diversity of society and we welcome applications from all qualified candidates regardless of personal background. The selection will be exclusively based on qualification without regard to gender identity, sexual orientation, religion, national origin or age.

Questions: For specific information about the PhD scholarship, the principal supervisor Jost von Hardenberg will be happy to answer your questions and provide advice (recruitment.ce@polito.it). For further information about CriticalEarth please consult the project website www.criticalearth.eu. General information about PhD programmes at Politecnico di Torino is available at <http://dottorato.polito.it/en/home>

Notes:

(1) 1951 Refugee Convention and the 1967 Protocol

(2) This is measured from the date when a researcher obtained the degree which would formally entitle him or her to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the researcher is recruited, irrespective of whether or not a doctorate is or was ever envisaged.