

Master Thesis Proposal:

Energy simulation of an outdoor test cell facility

Outdoor test cells are flexible facilities that allow characterizing building envelope components in real scale and under real weather conditions. The main aspects that can be addressed include the thermal and optical performance of façade components and their impact on Indoor Environmental Quality. At ESTP a young and dynamic research team is presently involved in the development of a new test cell facility in collaboration with eERG-Politecnico di Milano.

The student will assist the design through the numerical simulation by means of commercial and dedicated software tools. In particular, the candidate will:

- study the thermal behavior under dynamic conditions of the test cell facility by means of building energy simulation software such as EnergyPlus or TRNSYS. The student will also perform a cross-validation of an ad-hoc software tool already developed in Matlab environment. A particular attention will be reserved to the description of heat transfer phenomena taking place in the metering zone of the test cell, which is designed to operate as a state-of-the-art calorimeter.
- optimize an innovative thermal solar absorber to be placed inside the test cell for calorimetric tests. The solar absorber is conceived to rapidly remove entering solar gains and keep uniform environmental conditions inside the metering zone. The student will compare different geometries and configurations under the aspects of thermal performance and control strategies.

The work will be preceded by a literature review on energy simulation and solar technologies.

Place:

The master thesis will be supervised in collaboration with Ecole Spécial de Travaux Publiques (ESTP Paris)

Schedules:

A minimum period of 6 months is foreseen for the Master student at ESTP, starting **from September 2015**.

Scholarship:

The proposer of the thesis are keen on supporting candidates for Erasmus + traineeship (<http://cm.careerservice.polimi.it/career-program/erasmus-for-traineeship/>) and borsa di studio "Tesi all'estero" applications.

An additional scholarship is also available at ESTP.

Candidate profile:

We are looking for a student who followed **Building Engineering/Ingegneria dei Sistemi Edilizi** or **Energy Engineering/Ingegneria Energetica**, with a good knowledge and interest toward **Building Energy Performance, Applied Physics and Indoor Environmental Quality**.

Fluency in both written and spoken English is required, since the thesis will be written and discussed in English. Knowledge of French is encouraged but not compulsory.

Interested candidates may contact:

Prof. Francesco Causone – francesco.causone@polimi.it, attaching to the email a full CV including exam marks, and software knowledge (such as Matlab, EES, Simulink, ANSYS Fluent, EnergyPlus, TRNSYS, etc.).