Imperial College London
Department of Civil and Environmental Engineering
EPSRC CDT in Sustainable Civil Engineering

PhD Studentship:

Simulating the impact of blue-green infrastructure on the local microclimate of urban areas

Supervisor: Dr Maarten van Reeuwijk and Dr Ana Mijic

The project aims to quantify the impact of integrating urban green infrastructure (vegetated areas, green roofs, facades etc.) with blue infrastructure (urban water) on the local microclimate (temperature, humidity, air quality) in urban areas by means of high resolution large-eddy simulation.

With the mounting evidence of a changing climate due to anthropogenic CO2 emissions, a transition to a low-carbon future is necessary. As the World Health Organisation anticipates that by 2030, 6 out of 10 people will live in cities, it is evident that cities will play a vital role in this transition. Integration of the planning, design and management of green infrastructure interacting with blue infrastructure has a great potential to increase resilience of urban areas to adverse impacts of climate change and variability. The project is planned to develop series of planning and modelling tools which will facilitate design of new and retrofitting of the existing developments and quantification of performance indicators of Blue Green assets. In particular the new models should improve assessment of impacts of BG solutions on the reduction of: (i) potable water demand, (ii) urban pluvial flood hazard, (iii) urban heat island, (iv) noise and (v) air pollution. The modelling capacity can then lead to improvement of: (i) the buildings’ energy efficiency, (ii) biodiversity (iii) amenity and property value and in (iv) liveability of urban spaces.

This PhD project will focus on continuing the development of a simulation capacity for determining the local microclimate in an urban area and how blue-green solutions are able to modify this. A particular focus of the project will be to incorporate effects of trees and bushes into the simulation capacity. The project will involve incorporating physics-based models for the interaction between the vegetation and water in an existing large-eddy simulation model for atmospheric flow over urban areas. The PhD will involve a blend of fundamental studies (such as flows through street canyons with vegetation) and realistic case studies, which will be validated with results from full-scale experimental facilities which are currently operational.

Eligibility and Funding

Funding is available for applicants with settled UK status (see https://www.epsrc.ac.uk/skills/students/help/eligibility/ for eligibility). The studentship offers a
stipend of approximately £16,000 per annum (tax free) and covers fees at the UK/EU student rate for a period of four years.

Applicants should:

a. Hold or expect to hold an MSc/MEng in engineering (civil, mechanical, aeronautics etc.), meteorology or physics;

b. Be a citizen of the UK;

c. Have a background in numerical modelling and programming. Experience with high performance computing is beneficial but not strictly required;

d. Have good social and team working skills as the successful candidate will be part of a cohort;

Contact

For informal enquires and to request more information, contact Dr Maarten van Reeuwijk
(http://www3.imperial.ac.uk/people/m.vanreeuwijk)

This PhD studentship is co-funded by the EPSRC CDT in Sustainable Civil Engineering at Imperial College London:

(http://www3.imperial.ac.uk/sustainablecivilengineering)

Deadline

Review of application is now in progress and will continue until suitable candidate is identified. The starting date for this PhD Studentship is 1st of October, 2017.