UNSW Built Environment

ResearchStart Scholarship Program 2014

Never Stand Still | Built Environment | Application Form for STAFF

Staff Surname/s:	Osmond	**Staff First Name/s:**	Paul
Telephone/Email:	X 54915		
Your School:	☐ ASA+D ☒ AGSU ☐ Both Schools represented		
Name of the direct supervisor of this project (if other than the applicant or if there is more than one applicant i.e. team application)	Paul Osmond (and also Melissa Hart from Climate Change Research Centre, Faculty of Science)		
Student preference:	***Undergraduate*** ☐ ***Postgraduate Coursework*** ☐ ***Either*** ☒		

What types of skills would you prefer student applicants to have? *(Please check all boxes as appropriate)*

Quantitative	☒	**Qualitative**	☐	**Design**	☐	**Other**	☒
SPSS	☐	*Library research skills*	☒	*Digital*	☐	Please state	
Excel	☐	*Survey*	☐	*Physical*	☐	Familiarity with building performance simulation software	
NVivo	☐	*Interview skills*	☐	*Model making*	☐		
GIS	☐			*3D modelling*	☐		

SUMMARY RESEARCH PROJECT INFORMATION

Title of Project	Effect of green façades on building energy consumption

Project description and objectives

"Living architecture", defined as vegetation affixed to buildings as green roofs and façades, represents a useful technique to mitigate the climatic impacts consequent on both global warming and urbanisation. The applicant (PO) has been collaborating with Dr Melissa Hart from the Climate Change Research Centre since last September on the microclimatic effects of a series of "what if" configurations of green roofs and façades, using the prognostic micrometeorological model ENVI-met and the Central Park (Broadway) development as the case study site.

Living architecture has a dual benefit in that it can moderate environmental conditions both external and internal to the subject building. The present proposal seeks to extend the abovementioned work on *external* microclimatic effects, through application of building performance simulation to explore the *internal* effects of green façades on building energy use and thermal comfort. The objective is to provide an initial dataset which relates key aspects of green façade design (such as orientation, scale and coverage) to building energy and thermal performance, with the intent of informing further research as well as providing material for publication in its own right.

Methodology

The existing project is generating a substantial database on the effects of different green roof and façade configurations (and also street-level vegetation) on urban microclimate in the Central Park site. Recent empirical data on green façade performance will be obtained from Graeme Hopkins, Research Fellow with the CRC-Low Carbon Living Urban Microclimates project to refine the ENVI-met model. It is proposed to use the ENVI-met wall surface temperature *outputs* for a range of green façade configurations as *inputs* to a suitable building simulation program such as DesignBuilder or Ecotect. The latter models will then be run to determine ambient indoor temperature, energy consumption, carbon emissions and related parameters for the relevant buildings.

Expected project outputs

Urban microclimate research / practice and building performance research / practice, despite the obvious link between building performance and climate, tend to operate in disciplinary silos. Simulation of building performance usually relies on initialisation with generic (city/regional) climate data rather than site-specific information. There have been few studies which employ the site-specific outputs of a validated microclimate simulation tool as the inputs to a building performance model – and to the knowledge of this applicant, no such studies in Australia. Hence it is expected that the results of this investigation will provide material for a useful conference paper or journal article. In addition, the project outputs should be of value to the CRC-LCL Urban Microclimates project (which *inter alia* is examining the thermal properties of vertical urban surfaces); and potentially could serve as a pilot project to support an ARC Linkage or similar Category 1 grant application.

Student responsibilities
With guidance from and in collaboration with the investigators involved in the existing FBE/CCRC collaborative project (PO and MH), the student will be responsible for: • Briefly reviewing relevant literature to familiarise him/herself with the overall context; • Setting up and running a series of building performance simulations, as per the Methodology section above; • Analysing the model outputs and writing up the results; • Drawing on the above to prepare an initial draft of a paper suitable for conference or journal publication. Depending on the quality of the work, it is hoped that the student would be credited as the lead author. Note also that if the work offers the potential to support a Category 1 grant application, there may be further opportunities for the student to be involved in that process.
Minimum student qualifications
The student is more likely to come from a postgraduate background, but a suitably skilled / qualified senior undergraduate student may be suitable. The key selection criteria are familiarity with the theory and practice of building performance simulation, and well developed skills in written expression and graphic communication (i.e. capacity to prepare a competent draft of a publishable paper). The specific discipline/program to which the student belongs is of minor importance compared to the above criteria.

*Application due on **15 April 2014**, **fbe.ade.office@unsw.edu.au***

Associate Professor Oya Demirbilek
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