

Annex A5

RESEARCH COLLABORATION OPPORTUNITY

Research Collaboration Opportunity Ref No.: RCO-CUGE-2018-05

Project Title: Creating Cooler Green Spaces

1. Background

With temperatures set to rise, public green spaces in humid tropical urban landscapes need to be designed for optimisation of thermal comfort. The study of outdoor thermal comfort is a relatively mature field. To examine the effects of environmental parameters on human perceptions of thermal conditions, thermal indices such as the Physiological Equivalent Temperature (PET) Index (Höppe, P., 1999, The physiological equivalent temperature – a universal index for the biometeorological assessment of the thermal environment. International Journal of Biometeorology, 43:71-75) have been established.

2. Scope

2.1 We are seeking research proposals on how to optimise outdoor thermal comfort in public green spaces in Singapore parks which integrate both 'active' and 'passive' strategies for cooling green spaces. Active strategies could include cooling technology, but these must be powered by in-situ renewable energy sources, rather than from the power grid. Passive strategies could include landscape design to maximise wind flow and shade.

2.2 The proposed project should include (but not be limited to):

- (i) Identification and justification of selected sites for study
- (ii) Identification and recommendations on appropriate interventions which will improve thermal comfort
- (iii) Validation of the recommended interventions using measured and relevant data
- (iv) Demonstration of effective thermal comfort interventions on-site

3. Minimum Project Deliverables

The deliverables described here represent the minimum outcomes arising from the proposed project. Additional relevant deliverables that are proposed will be favourably considered during project evaluation.

- (i) Comprehensive and critical review of existing active and passive interventions to improve thermal comfort in outdoor spaces from academic and other sources.

- (ii) Recommendations on appropriate active and passive interventions to improve thermal comfort in major types of public green spaces (e.g., spaces in open parks with few trees, spaces in densely planted parks, spaces in 'pocket' parks surrounded by tall buildings, etc.) in Singapore.
- (iii) Demonstration of effective (at least 10% improvement in PET) active and passive cooling interventions in at least two key types of public green spaces in Singapore, each measuring at least 10m by 10m, which are supported by PET and other appropriate measurements. The interventions need to be cost-effective, and aesthetically acceptable to users of these green spaces (with appropriate measurements). Principles from these demonstration sites should be transferable to different types of green spaces in Singapore.
- (iv) Progress reports which are due on a 6-monthly basis and a final report at the end of the project.

4. Budget Limits

4.1 The proposed budget cannot exceed \$290,000.00. Proposals that exceed this limit will not be considered. Please note that this amount is simply an indication of budget availability, not an estimate of expected project cost.

4.2 The project duration should also not exceed 2 years. Proposals requiring more than 2 years can be considered, but with strong justification.

4.3 Please note that NParks' decision on the funding support to be awarded for the project is final.

5. Submission Instructions

Proposals for the Research Collaboration Opportunity as stated above must be submitted to Cybil Kho at kho_cybil@nparks.gov.sg by 14th November 2018, 1200 hrs.

6. Enquiries

For transparency, all enquiries and associated clarifications will be published (without details on the identity of the person making the enquiry) on the Research Collaboration Opportunity page on the CUGE website. We regret that phone enquiries will not be entertained.

For enquiries, please contact Cybil Kho at kho_cybil@nparks.gov.sg.