

URBAN MICROCLIMATES

COMPARATIVE STUDY OF MAJOR CONTRIBUTORS TO THE UHI EFFECT IN SYDNEY, ADELAIDE AND MELBOURNE

Research Questions

- How can **BUILDING FACADES** be designed to mitigate **URBAN HEAT** and improve **OUTDOOR THERMAL COMFORT**?
- What **KNOWLEDGE** will assist built environment professionals to design cooler facades and more comfortable, healthier outdoor spaces?

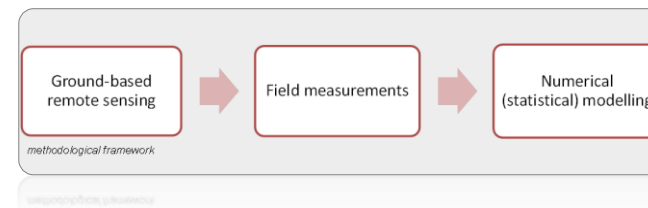
Figure 1: Case-study sites in metropolitan Sydney



Methodology

- In-situ meteorological data collection
- Terrestrial thermal and multispectral remote sensing
- Facade modelling and image processing
- Outdoor thermal comfort assessment
- Analysis on a Geographic Information System (GIS) platform.

Figure 2: Methodological framework



- Map data to develop a predictive **STATISTICAL MODEL**
- Account for intervening variables such as aspect ratio and sky view factor using spatial data from cadastre and LiDAR databases.

Figure 3: In-situ data collection

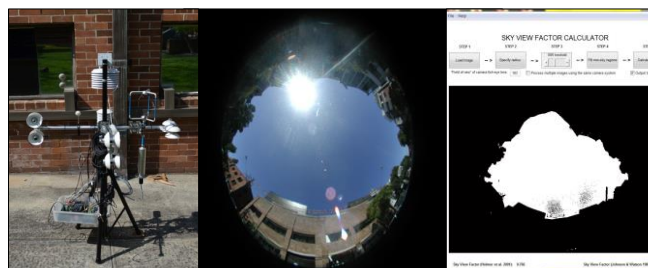
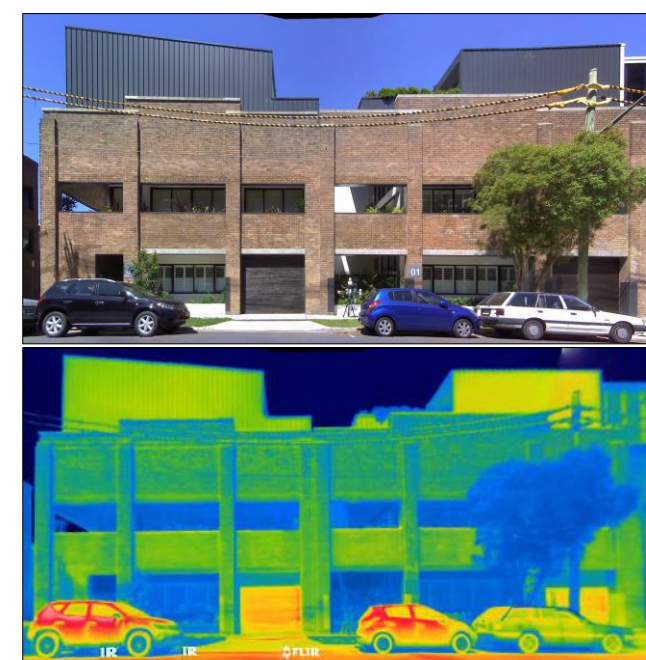


Figure 4: Hillshade and building footprint extraction from LiDAR data



Figure 5: Orthomosaics of building facades



Anticipated impacts

For ARCHITECTS to adopt microclimatic design principles they require diagnostic **tools** and predictive information about the microclimate effects of building design at spatial scales relevant to their decision-making.

This research advances the key challenge for **CLIMATE-SENSITIVE DESIGN** at all scales:

- linking physical characteristics of urban elements to intentional climate modification

The predictive model will quantify the impact of individual design decisions on outdoor climate and thermal comfort variables

Further information

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