

Prof. Dr Thomas Schroepfer
Principal Investigator

Prof. Sacha Menz
Co-Principal Investigator

Dense and Green Building Typologies



Right. PARKROYAL on Pickering (2013)
Image: Patrick Bingham-Hall



City of Kilchberg, Switzerland
City Area: 25,00,000 sq mts
Population: 7,400

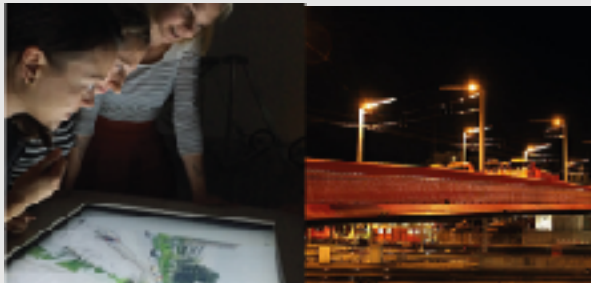
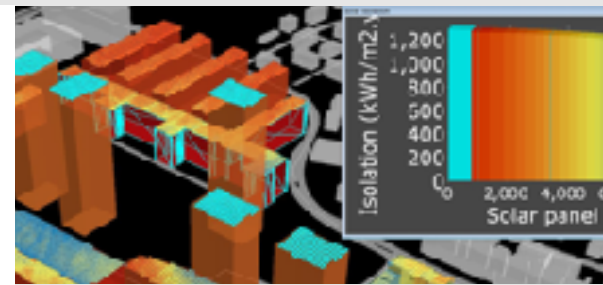
Pinnacle @ Duxton, Singapore
Area of Precinct: 28,000 sq mts
Number of Residents: 7,200

FCL Programme Structure



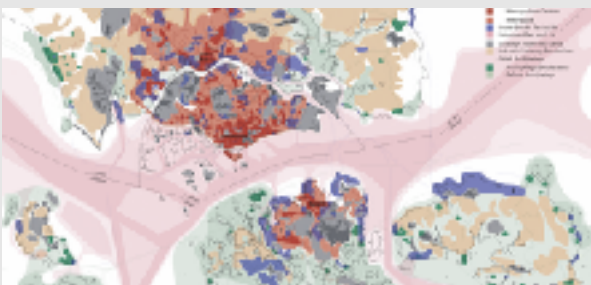
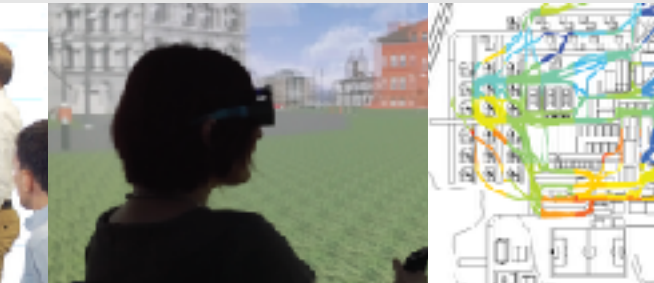
High-Density Mixed-Use Cities

The *Grand Projet*
Ecosystem Services
Multi-Scale Energy Systems
Dense and Green



Responsive Cities

BigData-Informed Urban Design
Cyber Civil Infrastructure
Engaging Mobility
Cognition, Perception and Behaviour



Archipelago Cities

SIJORI and Extended Urbanisation
Urban-Rural Systems
Alternative Construction Materials
Tourism and Cultural Heritage



Research Team

Principal Investigator

Prof. Dr Thomas SCHROEPFER

Project Coordinator

Dr Michelle JIANG

Associates

Dr HEE Limin

Asst. Prof. Dr YUAN Chao

Co-Principal Investigator

Prof. Sacha MENZ

Researchers

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Emek ERDOLU

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Thibault PILSUDSKI

Prashant RAJU

Ester SUEN

Jonathan TAN



Aims & Significance

Approach

Progress and Outcome

Events

The research contributes to the systematic understanding of environmental, social, urban, architectural and economic benefits of dense and green building typologies in high-density urban contexts.

Left. The Interlace (2015)
Image: Iwan Baan



Skyville @ Dawson



The Interlace



Oasia Downtown



Khoo Teck Puat Hospital



SOLARIS



Punggol Waterway Terraces I



Bosco Verticale



One Central Park

Aims & Significance

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We have reviewed over 400 national and international dense and green projects out of which eight (six in Singapore, one in Sydney, Australia and one in Milan, Italy) were chosen as case studies for a thorough investigation of their environmental, social, economic, and design benefits. The findings of all work packages serve as the basis for the Research Team's development of design strategies for dense and green buildings in high-density urban contexts. These will subsequently be tested in the context of the joint FCL Tanjong Pagar Waterfront Project.

Work Package 1: Environmental Benefits

- Air temperature
- Surface temperature
- Air quality
- Biodiversity

Work Package 2: Design Benefits

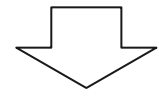
- Correlation between greenery and density (GFA / occupancy)
- Analysis of design strategies
- Analysis of urban context
- Civic provisions within larger green / blue networks

Work Package 3: Social Benefits *

- Post-occupancy space use
- Space perceptions
- Comfort and health

Work Package 4: Economic Benefits **

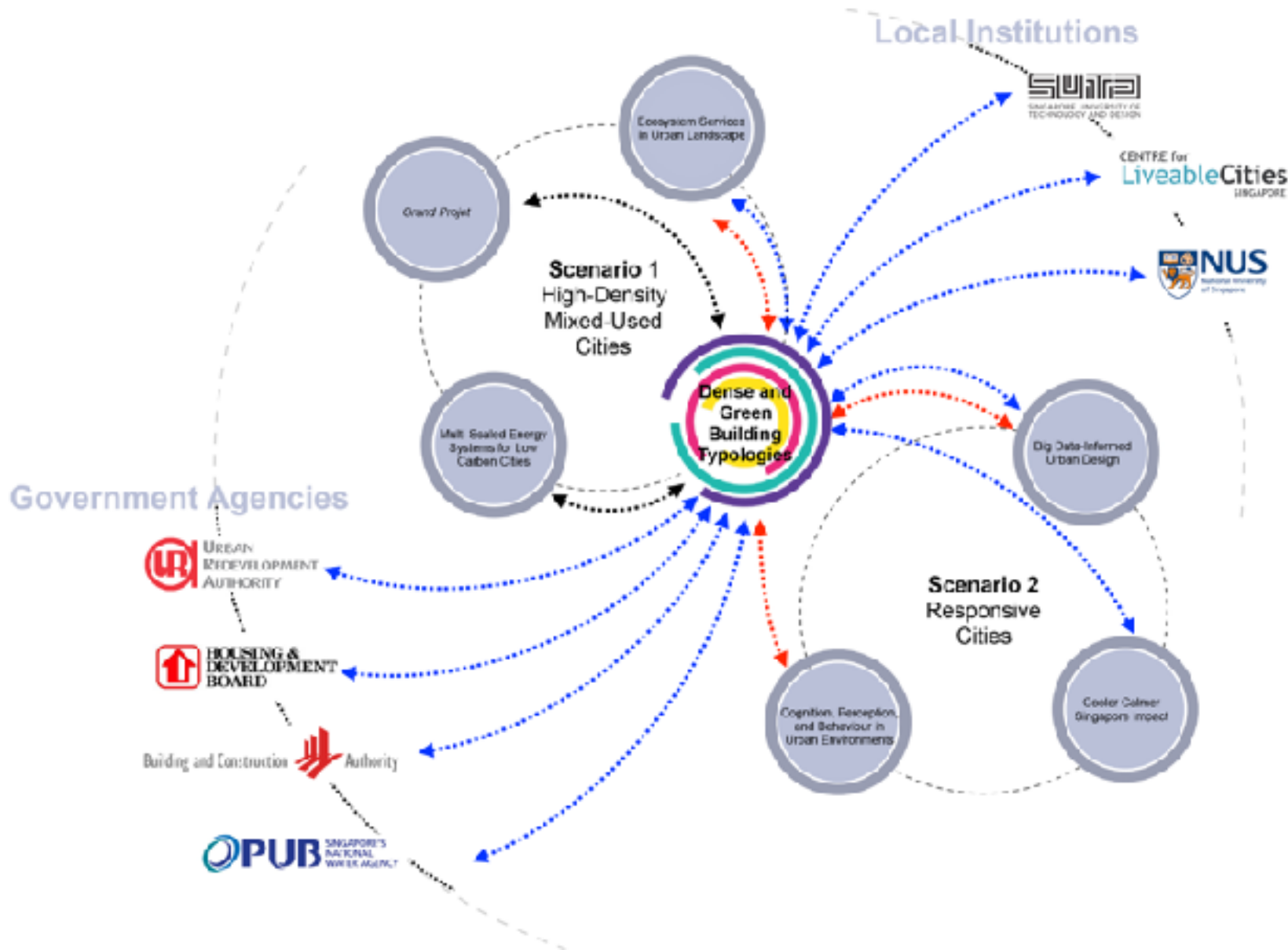
- Installation and maintenance costs
- Stated and revealed real estate value



Work Package 5: Synthesis



Top. Case studies overview
 Bottom. Research work packages
 *: This package applies the research methods of Module X Housing in FCL 1.0.
 **: The price choice experiment of the package is based on the research findings of Module X Housing in FCL 1.0.



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DGBT collaborates with other FCL teams on research methods design, data collection, analyses and the development of digital models.

Beyond FCL, DGBT collaborates with a number of Singapore research institutions and government agencies, including SUTD, NUS, URA, BCA, HDB, PUB, and CLC.

Top. Case studies overview

Bottom. Research work packages

*: This package applies the research methods of Module X Housing in FCL 1.0.

** : The price choice experiment of the package is based on the research findings of Module X Housing in FCL 1.0.

Aims & Significance

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Case study example: group8asia,
Punggol Waterway Terraces I (2015).



Left. Punggol Waterway Terraces I (2014)
Image: group8asia

Aims & Significance

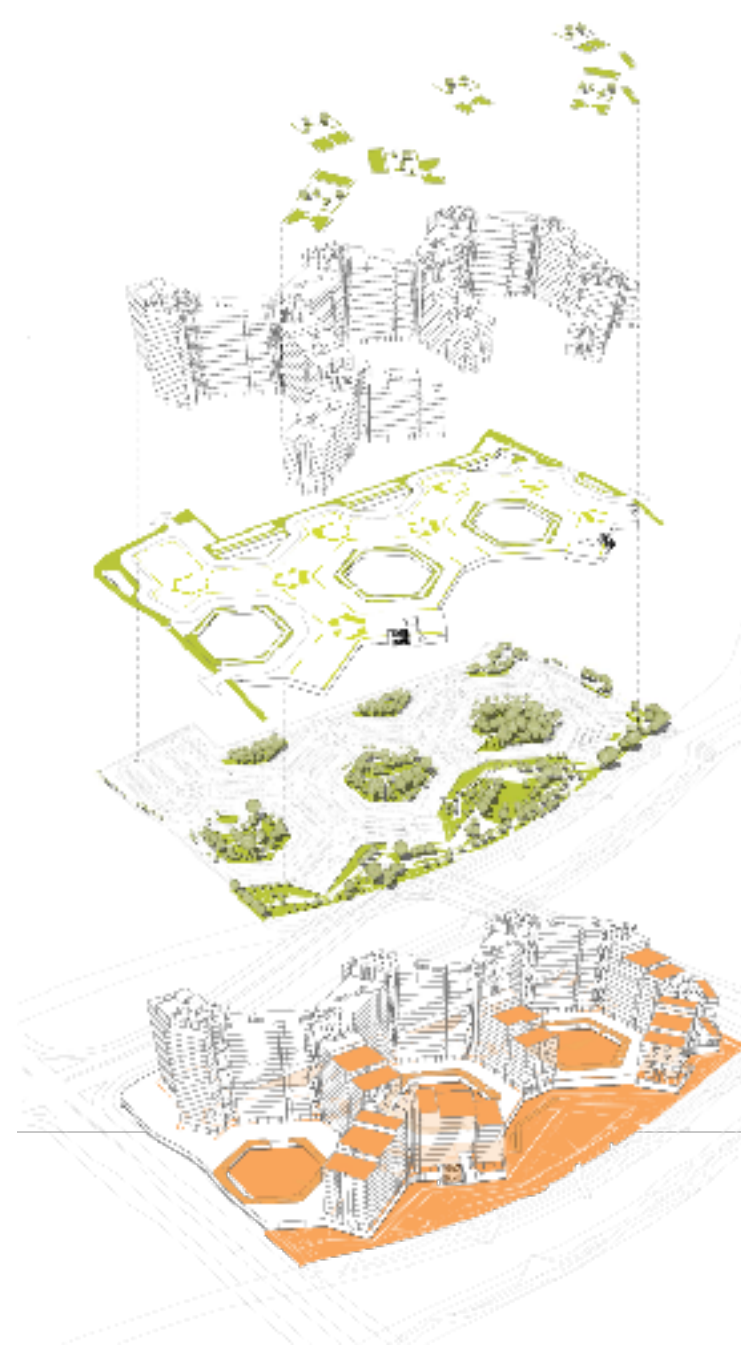
Approach

Progress and Outcome

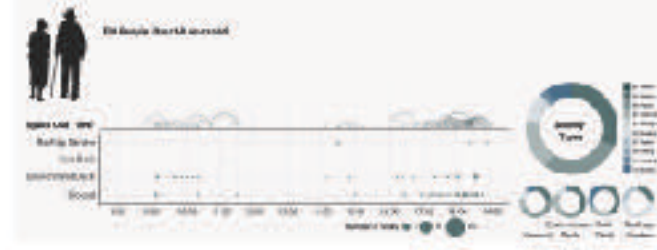
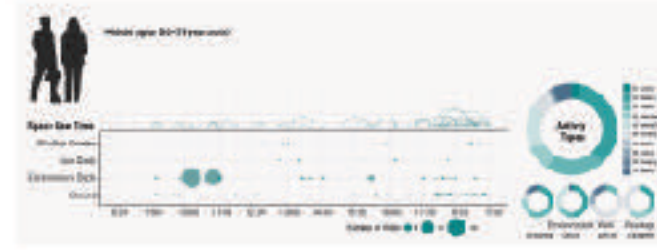
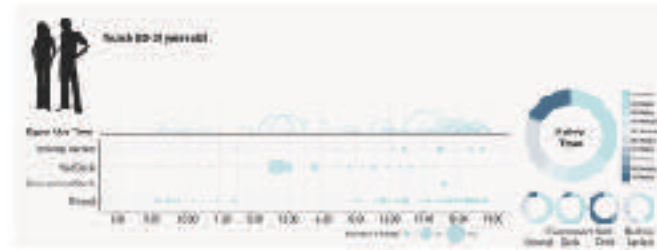
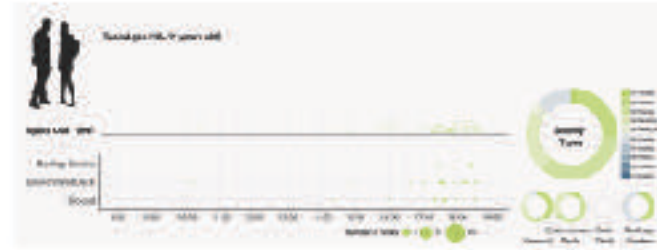
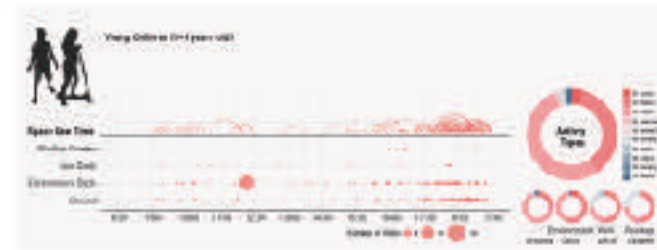
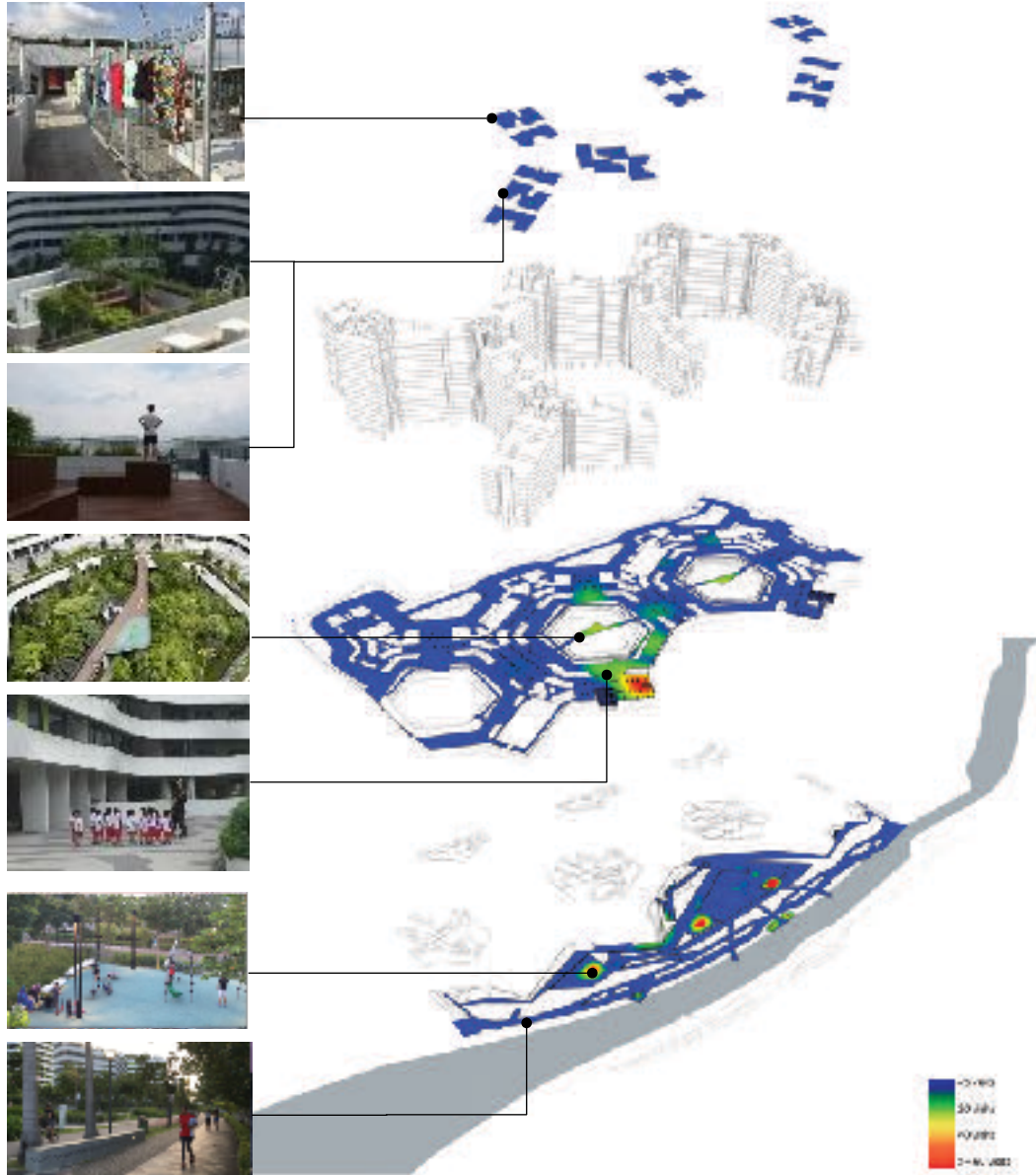
Events

Design benefits:

We investigate correlations between density and greenery through analysing building design, design strategies and perceptions of professionals, as well as the functions and perceptual qualities of green typologies in high-density urban contexts related to spatial definition, walkability, and storm water management.



Left. Urban density and open space coverage analysis
Right. Building and space typology analysis

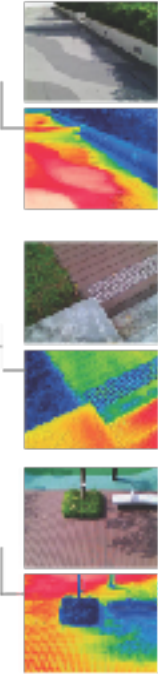
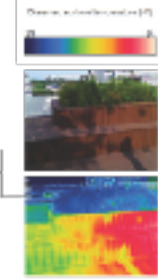
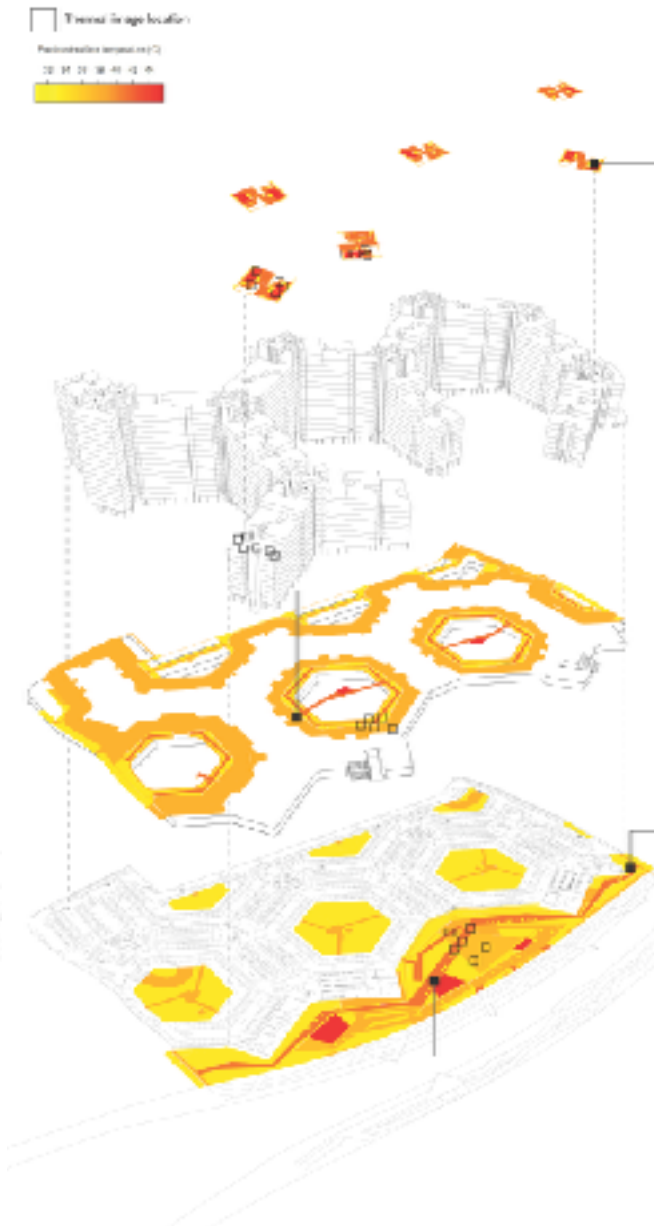
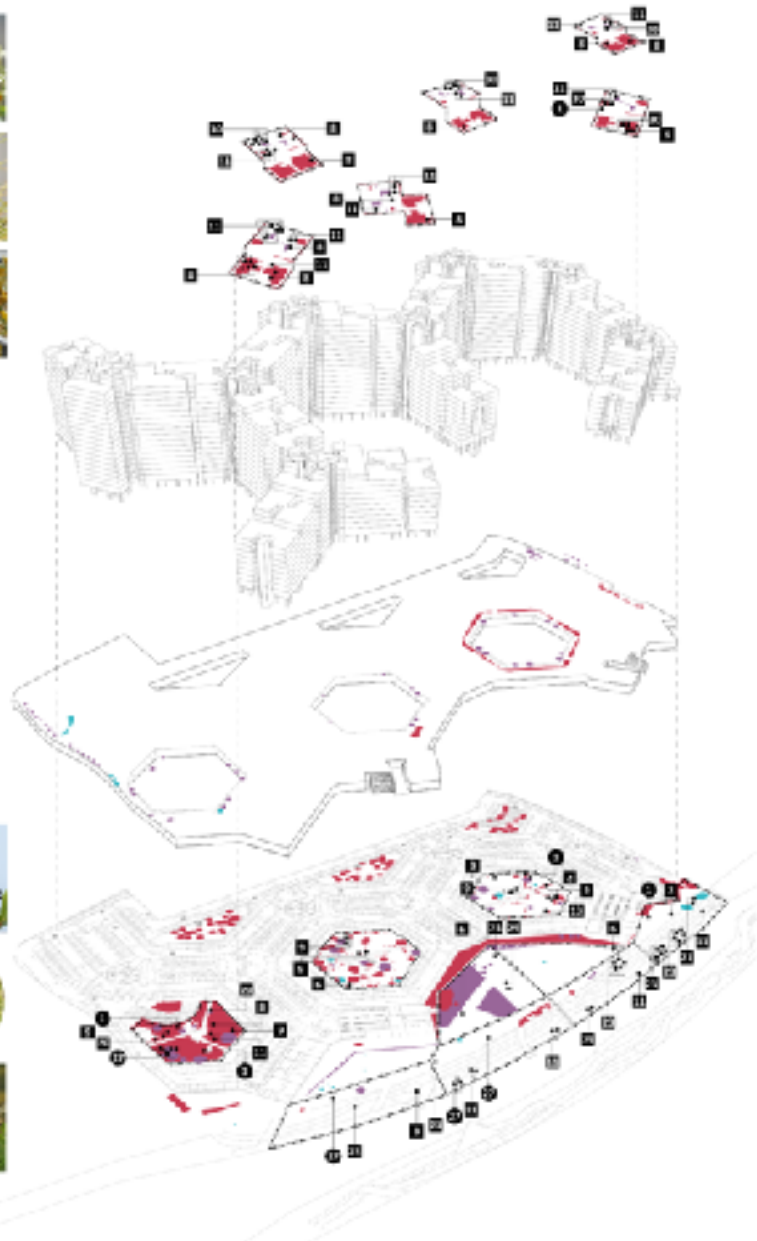


Aims & Significance
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Social benefits:

Studies the post-occupancy use of different dense and green building typologies, people's preferences in terms of space use and the influence of dense and green building typologies on activities, pedestrian movement, health and environmental comfort.

Left top. Children played on the Eco-Deck
 Left middle. People played in the playground
 Left bottom: People passed through the walkway near the river in early afternoon.
 Right top. Space use heat spots
 Right bottom. Pedestrian movement heat maps



Aims & Significance

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Environmental benefits:

Investigates vegetation and biodiversity on the site and how greenery influences the microclimatic temperature of social spaces on and around buildings.

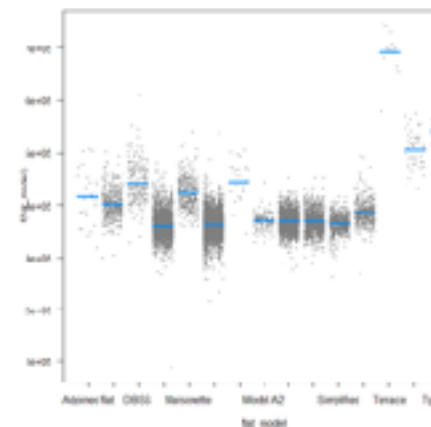
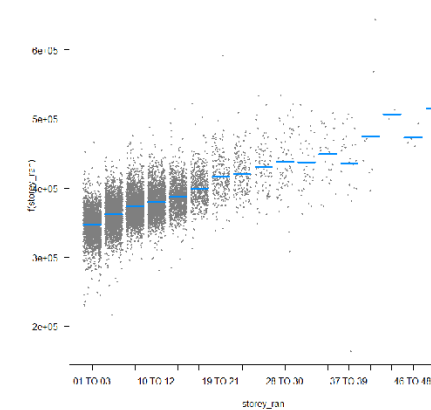
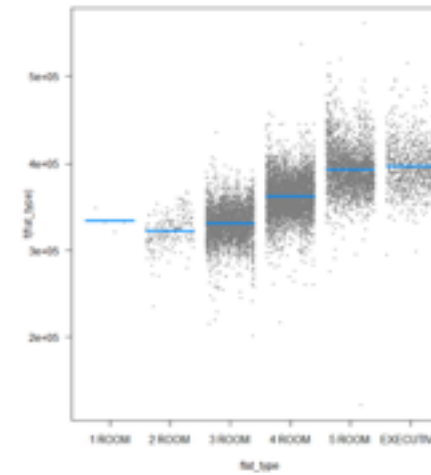
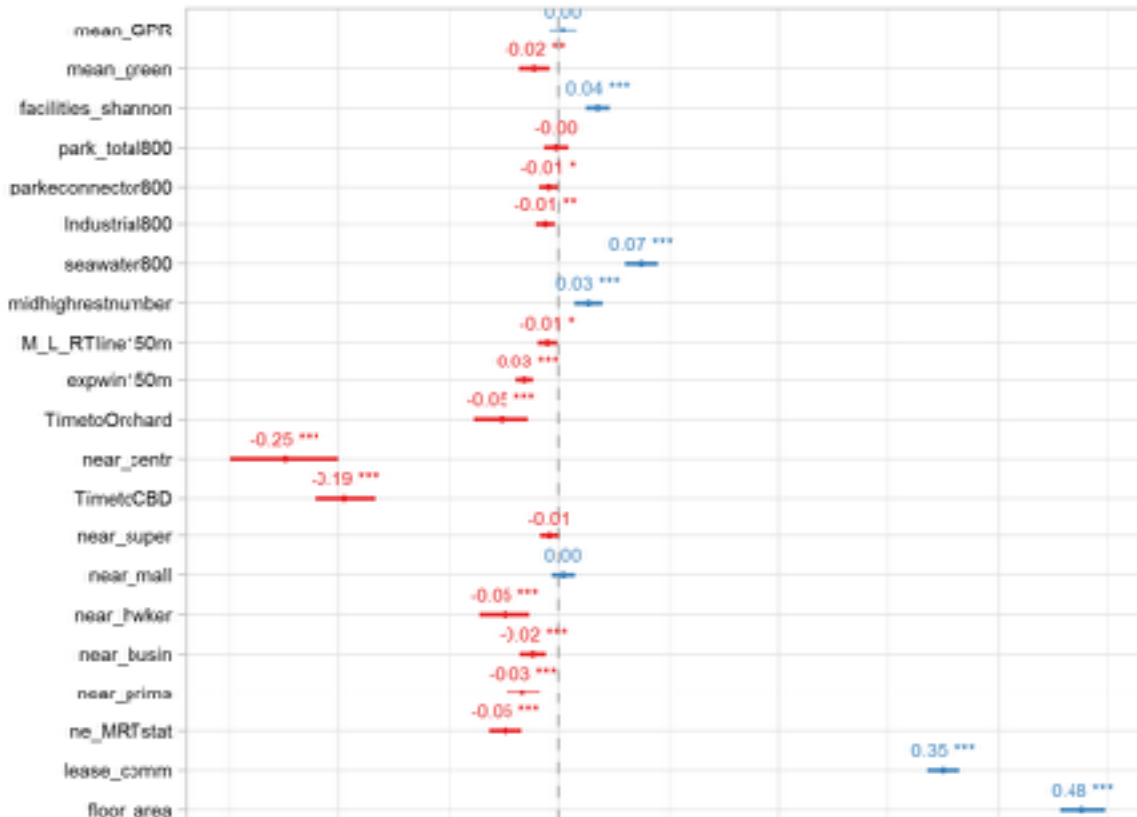
Left top. Vegetation and birds in Punggol Waterway Terraces I
Left bottom. Bird survey
Right top. Comparison on bird species diversity between dense and green buildings and dense buildings
Right bottom. Temperature logger data of a typical day

Economic benefits:

Investigates influence of greenery on:

- the cost of construction and maintenance,
- the property price, and
- the value of the neighbour

Standardized fixed effects



Left top. Vegetation and birds in Punggol Waterway Terraces I
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SYMPOSIUM | 30 AUGUST 2017 9.00 am - 6.00 pm | URA FUNCTION HALL

DENSE AND GREEN BUILDING TYPOLOGIES:

ARCHITECTURE AS URBAN ECOSYSTEM

ORGANISED BY

ETH zürich

(FCL) FUTURE
CITIES
LABORATORY 未来
城市
实验室

SUTD
SINGAPORE UNIVERSITY OF
TECHNOLOGY AND DESIGN

Aims & Significance
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Organised by Future Cities Laboratory (FCL) and Singapore University of Technology and Design (SUTD) and hosted by the Singapore Urban Development Authority (URA), the Symposium brought together important stakeholders, including policy makers, planners, developers, architects and landscape architects, to discuss how dense and green building typologies can contribute to developing compact yet highly liveable future cities.

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