Future Cities Laboratory

Sustainable Future Cities: Through Science, By Design, In Place

Combining science and design, the Future Cities Laboratory develops new knowledge, technologies, and approaches for a sustainable urban future with an Asian perspective.

Through Science

To achieve sustainability, science is essential. Science provides the basis for understanding how cities develop and interact with the environment at different spatial scales. A city is a complex system with a quantifiable 'metabolism' composed of diverse stocks and flows of resources. The scientific focus of FCL's research is to quantify and understand that metabolism, and how it is best structured and organised for the benefit of sustainable cities.

By Design

A sustainable city must also be liveable. To achieve liveability, good design is essential. Good design should translate scientifically sound solutions into plans for urban environments that are socially and economically viable. The design component of our research focuses upon the quality of life – well-being, comfort, convenience, security, and satisfaction – that cities offer to their inhabitants, while ensuring that solutions contribute to urban sustainability.

In Place

Science and design are effective only if they serve places and the lives that are lived in them. Places result from differentiating factors (geography, culture, language, history) and common processes (growth and decline; competition and cooperation; ebb and flow of capital, people, goods, technologies and ideas; climate change). FCL's research acknowledges this by focussing on lived places in forms of city that are important in Asia.

- **Compact cities:** with very high population densities like Singapore, Hong Kong, and Taipei.
- **Extended cities:** with a mosaic of urban and rural land-use, and locally high densities; the dominant urban form in Asia, such as Bangkok, Jakarta, and Manila.
- **Responsive cities:** wireless, sensor, and broadband enabled technologies improve planning and management in cities like Singapore, Copenhagen, and Zurich.

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(SEC) SINGAPORE-ETH CENTRE 新加坡–ETH 研究中心

(FCL) FUTURE CITIES LABORATORY 未来城市实验室

Research Modules

Research at the Future Cities Laboratory is organised in three scenarios as follows

COMPACT CITIES

1.1 The *Grand Projet*
1.2 Ecosystem services in urban landscapes
1.3 Multi-scale energy systems for low carbon cities
1.4 Dense and green building typologies

RESPONSIVE CITIES

2.1 Big data informed urban design and governance
2.2 Cyber civil infrastructure
2.3 Engaging mobility
2.4 Cognition, perception, and behaviour in urban environments

EXTENDED CITIES

3.1 Territories of extended urbanisation
3.2 Urban-rural systems
3.3 Alternative construction materials
3.4 Tourism and cultural heritage

Outcomes

- Science-based approaches to design and planning
- Application of technologies in diverse kinds of city in Asia
- Design scenarios for sustainable urban development
- Curriculum development

Programme Director

Stephen Cairns is Professor at ETH Zurich. He held a personal chair of architecture and urbanism at the University of Edinburgh, where he was also Director of the Edinburgh School of Architecture and Landscape Architecture. He practiced as an architect and urban planner in New Zealand, Australia, and the Pacific.

The Singapore-ETH Centre

Future Cities Laboratory is the first programme of the Singapore-ETH Centre for global environmental sustainability, established by ETH Zurich – the Swiss Federal Institute of Technology in Zurich and Singapore's National Research Foundation (NRF), as part of the NRF's Campus for Research Excellence and Technological Enterprise (CREATE).

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