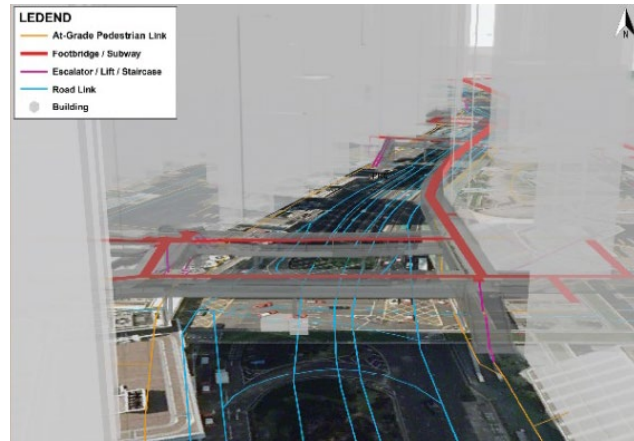


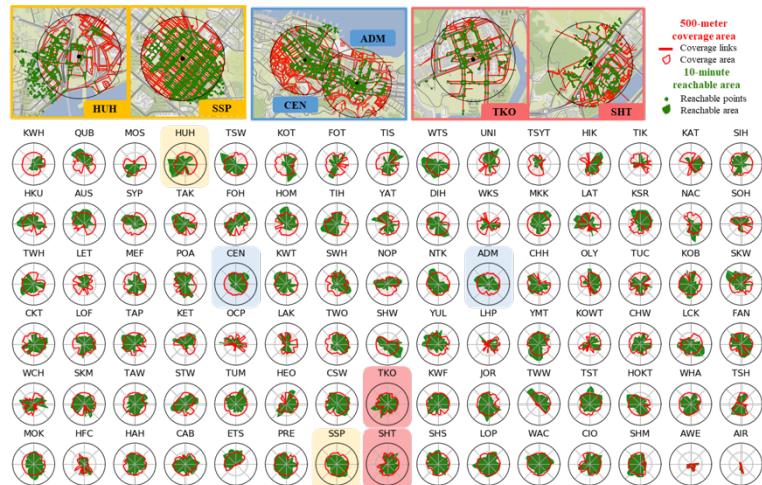
News Article for RISUD Strategic Focus Area (SFA) Scheme

	Name	Department
1. Principal Investigator:	Prof. Anthony CHEN	CEE
2. Name of SFA:	Urban Simulation	
3. Project Title:	3D GIS, Land-Use Planning Scenarios, and Transport Models for Urban Simulation	
4. Final Year Progress/Achievement		

The project collected necessary data input to establish a geospatial database platform for urban stimulation from different sources of government data. One of the newly released data is the **regional-wide three-dimensional (3D) pedestrian network dataset**. The combined multi-layered network data which consists of traffic road, public transport, pedestrian networks provide the basis for urban simulation research introduced below:



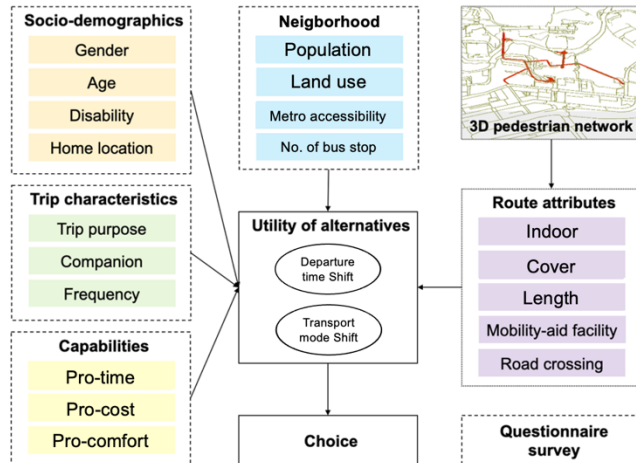
Accessibility and mobility calculation in the 3D walking environment. The research team tested, evaluated and visualized the accessibility (ease of getting to destinations or activities) and potential mobility (ease of travelling along transport networks) of pedestrian networks around metro stations in Hong Kong. Accessibility: ease of getting to destinations or activities. Two catchment areas (500-meter walking coverage area and reachable area with a 10-minute walking distance) reflect the accessibility and mobility. The result shows there are significant differences between accessibility and mobility for some stations, such as Kwai Hing, using the newly released 3D pedestrian network in Hong Kong.



Pedestrian accessibility in the COVID era. The team conducted a before-and-after analysis to visualize the impact of the Covid-19 vaccine passport (VP) restrictions on the use of indoor public space on pedestrian accessibility to all 97 metro stations in Hong Kong. Results show that vaccine

passports have caused a 50% reduction in accessibility of two-thirds of stations for pedestrians without a vaccine passport (PwoVP). Particularly, PwoVP must walk 460 m longer to reach Kowloon (KWO) station while Tai Wo (TWO) and Ma On Shan (MOS) stations are totally inaccessible to PwoVP. The findings can help to evaluate the effectiveness and fairness of social distancing policies in restricting access to public spaces, such as the VP system.

Travel behavioral change. Three-dimensional transportation space is one of the most important characteristics of multi-layered cities like Hong Kong. Using both small (questionnaire survey) and big (large-scale geospatial) data, we analyzed mode and departure time shift behaviors in response to travel time change for 2,927 participants and examined the impacts of new variables derived from a 3D pedestrian network dataset and potential influencing factors identified in the literature. The results from the mode shift model indicated that having more efficient pedestrian networks, as measured by the total length of walkways and the provision of mobility aid facilities (e.g., travellers, escalators), is effective in promoting mode shift behaviors. Meanwhile, the departure time shift model revealed that having more comfortable walkways, as measured by travel attitude and the provision of mobility aid facilities, increases users' willingness to make departure time shifts from peak to non-peak hours. These findings suggest that a more efficient and comfortable walking environment facilitates mode and departure time shift behaviors in daily travel. Improving the building and management of walking environments would contribute to a more integrated multi-modal public transport system in Hong Kong (e.g., MTR, bus, ferry).



Route choice with respect to underground space.

The intensive development of the metro system has enabled the building of underground infrastructure that facilitates pedestrian movement from underground to the surface, and between surface areas. Based on a face-to-face questionnaire survey conducted in a new station area of a hilly neighborhood (e.g., HKU station) and route attributes derived from the 3D pedestrian network, the results indicate that route attributes, especially travel time and the existence of a lift-only exit, have an important effect on the intention to use underground routes. The results also show that older adults, the disabled, and those living near metro stations are more willing to use underground walking routes. These findings can be used by urban/transport planners to support strategies concerned with the future implementation of underground pedestrian networks in multi-layered cities like Hong Kong.

